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THE DEVELOPMENT OF HIGHER-ORDERS OF PERCEPTUAL HABITS IN READING

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THE ability to read accurately and fluently hinges, in the final analysis, upon the correct observation of words or combinations of words and upon the degree of skill that has been attained in having these printed language symbols suggest to the reader the meanings which they represent. It is the purpose of this paper to show how this problem is solved at different levels of reading skill and to indicate how learners of this subject may be helped in solving this problem.

I. HOW PRINTED AND WRITTEN WORDS ARE RECOGNIZED

There are two theories with regard to how printed words are recognized. The first theory, which is generally accepted by American psychologists, maintains that words are perceived as a whole in the same way that chairs, trees, and other objects are recognized by the total impressions they make upon the retina of the observer. There are certain distinguishing features about the shape of a chair or a tree that are responsible for the observer's ability to distinguish it from any other object that he may perceive. The experimental evidence in favor of this view is that words are perceived just as quickly and easily as letters, and short words more quickly than letters. Erdmann and Dodge[1] find that words are recognized when they are too far removed for the letters to be seen. It has also been shown that words having the most individual form can be more easily recognized than such words as "now" and "no." It has further been pointed out by advocates of this view that in life we perceive the whole first, then learn to analyze and distinguish the parts. This suggests that the same procedure is probably followed in observing language symbols in reading. It is believed that only certain letters or parts of a word are noticed and used as cues to recognize the whole word.

[1] Erdmann, B., and Dodge, R. Psychologische Untersuchungen ueber das Lesen auf Experimentaler Grundlage, Halle, Germany, 1908.

This theory has led to the development of the word and sentence methods of teaching reading. It makes the word and sentence the unit of perception and the meaning of the words an aid for learning to recognize and interpret the printed language symbols.

A second theory with regard to how printed and written words are observed and recognized asserts that learners perceive the letters and certain parts of the word *before* they perceive the word as a whole. This view is based on very extensive experimental research. Studies show that certain letters in the printed words are more important for correct recognition than others. They also show which letters are the determining ones. They make clear that some letters within a word may be omitted without interfering with the correctness of the perceptual and recognitive processes, and that it is the relative position of the letters in the word, more than the form of the letters, that determines the reader's ability to recognize the word. If these determining letters are omitted, the word cannot be correctly recognized; if they are included, the word can be accurately recognized and the correct meaning attached to it.

Zeitler's[2] investigations, for example, made him conclude that word recognition was dependent upon certain letters and dominating parts of the word which carried or suggested its meaning. His experiments show that these dominating parts of a word might be letters, combinations of letters, or even syllables.

Messmer[3] examined a large number of individuals and found that some tended to perceive the word as a unit. These individuals he called his subjective type. Other subjects seemed to be dominated in their perception of words by certain determining letters or dominating parts of the word. These he called his objective type of observer. He found that his subjective type of reader tended to guess more during the process of perceiving the words. They, therefore, made a lower rating on comprehension than did the objective type. His experiments also showed that the dominating parts of a word were the letters that projected above the line.

Huey's[4] experiments show that the first part of a word generally plays

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[2] Zeitler, J. Tachistascopische Versuche Ueber das Lesen Wundt's Philosophische Studien, Bd XV h. 3.

[3] Messmer, O. Zur Psychologie des Lesens bei Kinder und Erwachsenen; Archiv fur die Gesamte Psychologie, Bd II, Heft 2, M. 3.

[4] Huey, Edmond B. *Psychology and Pedagogy of Reading.* The Macmillan Co., 1908.

the dominant role in the recognition of the word. He verifies Messmer's results, showing that the letters extending above the horizontal line are the ones that determine its correct recognition. His studies further show that these determining letters are not perceived *separately* or *before* the word is recognized as a whole. The noting of these determining letters is all that is needed for the perception of the word.

Dearborn's[5] investigations show that there is a marked difference between good and bad readers with regard to the manner in which printed words are discerned. A poor reader notices parts of the word, which, according to Dearborn, have to be combined before the word may be recognized as a whole. This is also the case when the recognition of words depends upon the spelling or pronunciation of the letters or phonograms that compose them. Good readers, on the other hand, are able to recognize words as wholes and often, in the process of reading, combine them into phrases.

Further light is shed on the problem of word recognition in reading by Goldscheider and Miller's[6] investigation which shows that after the printed words become familiar, they are perceived and recognized as wholes. Other experiments show that continued practice in observing these language symbols extends the perceptual span or number of words that can be recognized during one of the pauses in eye movements. C. T. Gray's[7] experiments on eye movements show that as the rate of reading increases, the perceptual span widens and that the reader's perceptual span is increased by practice.

All of these experiments were performed on adults and throw important light on how language symbols are perceived by them. They have led to important improvements in the making of more legible type, and in the printing of books. A far more important problem, however, is to determine how printed words are discerned and recognized at different levels of reading skill, and how a learner must proceed to attain the highest form of perceptual skill that is used by the most skillful silent readers to-day.

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[5] Dearborn, W. F. *The Psychology of Reading*, Columbia University Contributions to Philosophy and Psychology, XIV, No. 1.

[6] Goldscheider, A., and Miller, R. F. Zur Psychologie und Pathologie des Lesens: Zeitschrift fur Klinische Medizin, XXII, 1893.

[7] Gray, C. T. *Types of Reading Ability as Exhibited through Tests and Laboratory Experiments*, Supplementary Educational Monographs, Vol. I, No. 5, pp. 123-146.

2. LEARNING TO RECOGNIZE AND INTERPRET LANGUAGE SYMBOLS A GENETIC PROCESS

The results of the experiments already described clearly indicate that the matter of perceiving the printed words is a genetic process and that the two theories of word recognition already described do not in reality conflict but supplement each other since they probably describe what is happening at different levels of reading skill. This view is supported by the results of experiments on the eye movements made by readers representing different levels of reading skill. These investigations show that the matter of perceiving and recognizing the printed language symbols is a progressive process which starts on a very low level with the recognition of letters and parts of words. At a later stage in the learning, the reader can apprehend the meaning of several words during one perceptual pause because he has learned to combine them into a phrase or sentence which he now is able to observe and interpret as a whole. At a still later stage, the most expert readers will select and observe only the key words in a sentence and the key sentences in a paragraph.

The investigations on the eye movements made by persons possessing different degrees of reading skill have also shown that a close correlation exists between the character of the eye movements made in reading and the reader's ability to get the meaning from the printed page. It has been found that those who make the fewest eye movements per line or page can comprehend best what is being read and that periods of confusion in eye movements are regularly accompanied by hesitation in the voice in oral reading, by mistakes in comprehension, and by a decrease in the silent reading rate. Buswell's[8] experiments, for example, show that a skilled reader reads the same material almost ten times as fast as a beginner, makes about one-seventh as many pauses, has fewer periods of confusion in perceiving his words, and uses only about seven-tenths as long a time per fixation pause. His results for a typical first grade pupil and a college senior are shown in Table I:

TABLE I

EYE MOVEMENTS OF A BEGINNER AND SKILLED READER COMPARED

	First Grade	College Senior
Words read per minute	39.6	369.
Number of fixations per line	21.3	3.6
Number of regressions or refixing movements per line	6.8	0.0
Time for each fixation	.45 sec.	.32 sec.

[8] Buswell, G. T. *Fundamental Reading Habits, A Study of Their Development*, 1922, p. 275.

The experiments upon eye movements made by C. H. Judd[9] and his associates have shown similar results. Immature readers are characterized by a narrow span of recognition. Poor reading in the upper grades is characterized by a persistence of short units of recognition which seem to have become habitual. Little children, just beginning to read, never comprehend more than one word and sometimes not that during one fixation pause of the eyes. As they grow older, they are able to apprehend more words or larger language units during one fixation pause. In the third grade the unit of perception is the word, but a few of the best readers in this grade are able to recognize short phrases at a single fixation of the eyes. In the fourth grade phrases are more often recognized in a single fixation pause. The poorest readers in every grade show long fixation pauses, short spans of recognition (where only a small group of letters have been seen), many regressive movements of the eyes, and other signs of confusion, which indicate that the perceptual problem is handled by them on a very low plane of efficiency.

There is also a rapid decrease in the number of fixation pauses as we proceed from the first to the fourth grade. After this there is little change from year to year. Considering Buswell's results on this point as typical, we may say that the average number of fixations of the eye in the first grade is about 15 or 16 per line; in the third grade about 9; in the fifth grade about 7, with very little improvement after that until the sophomore and junior year in college. This means that there are more than twice as many words comprehended in one fixation pause by pupils in the fifth grade as by pupils in the first grade.

With this *decrease* in the number of fixation pauses per line there regularly goes a decrease in the time spent at each fixation. Contrary to what might be expected the time per fixation actually decreases as the unit of recognition increases. The decrease in time is from about .5 or .6 of a second per fixation pause in Grade I, to .2 or .3 in Grade IV, and to .2 in Grades VI and VII. After this there is little change.

It is also shown that the regressive movements of the eyes or periods of confusion disappear rapidly as we progress from the first to the fifth grade. In the 1B the average number of regressive movements per line is 5.1; in the fifth grade this has decreased to 1.3; in the senior class of the high school it averages only .7.

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[9] Judd, C. H. *Reading, Its Nature and Development*, Elementary Educational Monographs, Vol. II, No. 4, July, 1918, Chapter IV, pp. 54-81.

The character of the eye movements made in reading, therefore, indicate the nature of the perceptual habits that are being used at any particular stage of skill and calls attention to some of the factors which condition the formation of the higher-orders of perceptual habits used by the most skillful readers to-day. The difference between a college senior who reads 369 words a minute with only 3.6 fixations per line and spending only three-tenths of a second on each fixation, and an individual who is able to read only 39.6 words a minute and who makes 21.3 fixations per line with seven regressive movements of the eyes represents a difference not merely in the eye movements involved, but in the type of perceptual habits that are being used by the reader. It is, therefore, important to try to determine how these higher-orders of perceptual habits are developed so that we may take steps to see that they are acquired in the most efficient and economical way.

3. HOW HIGHER-ORDERS OF PERCEPTUAL HABITS ARE DEVELOPED IN LEARNING TO READ

Two theories have been advanced with regard to how the higher-orders of perceptual habits used in reading may best be developed. The first maintains that the unit of recognition is the word and that much practice must be given to the observation of words to increase the learner's ability to read. Learners are, therefore, given special supplementary drills on the recognition of isolated words. Later they are drilled on the recognition and interpretation of sentences of every form and type. Where this is done, it is assumed that the reader will be able to combine these words correctly in observing the higher language units and will be able to get the meanings which they represent. It is also assumed that the learner can follow the thought of the author by combining words and sentences in the proper way in rapid reading without much special drill on this particular type of performance.

Other students of the learning process hold that the various orders of perceptual habits which all learners of this subject must acquire are related to each other in a certain way, and form what has been technically called a hierarchy of perceptual habits. They believe that the child first learns to recognize and interpret words. Later these words are combined into phrases and sentences that form a larger perceptual unit which soon comes to be handled as easily as the reader formerly observed individual words. Finally the learner acquires the ability to

deal with paragraphs and the largest language units that he is required to interpret or read.

The advocates of this view maintain that the recognition of words is an element in the recognition of phrases and sentences, that practice in the recognition and interpretation of words should be given by having the learners read sentences, and that practice in the recognition of the special sentence forms can best be given by having the learners read and interpret actual paragraphs of which the sentence is the elemental unit. In other words, the theory maintains that the word and sentence-recognition habits should always be practiced in their proper language setting.

Another explanation of how higher-orders of perceptual habits may best be developed in learning to read combines to a certain extent the two methods of practice already described. This theory asserts that after a certain familiarity with the more common words, they should be combined into sentences, and that improvement in the recognition of sentences can best be secured by first stressing the sentence and then by much reading of authors who possess a clear and varied style. It should, however, be pointed out that in no case can the interpretation and recognition of sentences proceed faster than the word units can be recognized and properly interpreted. The advocates of this theory maintain that some special practice should be given with a view of improving the reader's ability to recognize words, but that most of the practice should be given to reading these words when arranged in their proper language setting.

The importance of developing such a hierarchy of perceptual reading habits is clearly indicated by a number of facts about perceptual learning that have recently been ascertained. These have clearly shown that efficient reading involves much more than the mere recognition and correct interpretation of individual words. In fact, the correct recognition of words is only an element in the type of perception that takes place when a reader is getting the thought from a printed page. Learning to perceive the printed symbols correctly means acquiring the ability to understand accurately and quickly the meaning which a particular *arrangement* of words represents. This recognition and interpretation of a *series of words* not only makes the recognition of the individual words more accurate and sure, but increases the reader's perceptual span and, therefore, the number of things which he can apprehend at once.

No one has determined just how these higher-orders of perceptual habits are developed. The ability to recognize individual words is normally completed in the third or fourth grade, but the development of the higher phases of the recognition required to read rapidly and effectively requires a certain control over the perceptual and observational processes used in reading that is very different from the process of merely observing words. In fact, the studies of observational learning have shown that the ability of a child to direct his attention towards the significant features of a picture or a scene and to report faithfully and accurately what he observes, requires a control over the attention and selection processes which goes far beyond the power to recognize simple forms and objects. The same is true in learning to read. Acquiring greater skill in silent reading is dependent upon increasing the learner's *control* over what is noted or perceived rather than upon improving his ability to recognize individual words.

No one has shown how a teacher or learner must proceed to develop the highest type of perceptual habit or the control needed to read in the most effective manner. That such improved reading habits are developed is shown by the marked improvement which learners of this subject regularly make both in the rate and in the accuracy with which they can interpret the printed page. Many investigations show that the rate of reading as well as the accuracy with which an author's thought can be apprehended is much improved by the right kind of practice. These experiments have also shown that there is a direct correlation between speed and accuracy in reading. How may a learner's efficiency in reading best be increased?

(*1*) *Possibility of Improving a Pupil's Reading Rate.*—A number of studies have been made to determine the extent to which the rate of silent reading could be improved by specific practice. Miss Harriet O'Shea gave a group of high-school students a book to read, stating that each student was to spend fifteen minutes a day reading the book until it was finished and that an accurate account of the number of lines they read each day must be kept. Her results showed a remarkable increase in the rate of reading from the beginning to the end of the book. Some pupils gained very little. Many pupils gained as much as 100 percent in speed, and others gained 160 percent. Huey[10] states that he was able to double his speed of reading by special effort and practice.

[10] Huey, E. B. *Psychology and Pedagogy of Reading*, The Macmillan Co., 1908.

C. C. Peters[11] undertook an experiment to determine the effect of speed drills conducted regularly during a whole school year. The pupils in grades three to six were divided into "drill" and "no-drill" sections. The "drill" sections were given daily speed drills in addition to their oral reading, but devoted no more time to reading than the "no-drill" sections which were given the usual instruction in reading. Other conditions were kept uniform. Tests were given to both groups at four different times during the year and the ratings made by the two sections on a standard reading test were compared. The "drill" group showed a gain over the "no-drill" group of 18.7 percent and a loss of only 1.1 percent in comprehension.

(2) *Relation Between Speed and Comprehension.*—Many studies have been made which have shown that a fast rate of reading and good quality in comprehension are usually found together and that a slow rate of reading and a poor quality of accuracy are commonly found in the same individuals. Starch[12] divided the pupils of each grade from the Port Townsend, Washington School, into six groups according to their speed in reading. He grouped the six slowest readers together, then the six that made the next poorest grade in reading rate, and so on to the six individuals who made the highest score in reading rate in the school. Table II shows the records made by each group in speed and comprehension.

TABLE II

RELATION BETWEEN SPEED AND COMPREHENSION

Words Read In Thirty Seconds	Words Written	Speed per Second	Percent of the Words Read that Were Correctly Written
36	16	1.2	46
51	22	1.7	43
69	24	2.3	35
90	33	3.0	37
105	33	3.5	31
147	54	4.9	37

As Table II shows, the percentage of comprehension in relation to amount read was 46 percent for the slowest readers and 37 percent for the fastest readers. In other words, the percentage of comprehension of the fastest group of readers was almost as large as for the slowest group, notwithstanding the fact that they read almost four times as

[11] Peters, C. C. "Influence of Speed Drills on Silent Reading," *The Journal of Educational Psychology*, VIII, (1924), pp. 350-366.

[12] Starch, Daniel. *Educational Psychology*, Revised Edition, (New York: The Macmillan Co., 1927), p. 333.

much as the slowest group. The ratio for speed of reading for the two groups was one to four, while the ratio for comprehension was one to three and one-third.

It would, of course, be unreliable to conclude on the basis of these and other similar results that there is any causal relation between speed and accuracy in reading. Some slow readers are very accurate in comprehension and some rapid readers are very inaccurate, but Whipple and Curtis[13] found that their slowest reader was the poorest reproducer, and that their best reproducer was one of their fastest readers. All that the results on the relation between speed and comprehension show is that speed and accuracy in reading usually go together, and that increasing one's rate of reading does not necessarily make him less accurate in his understanding of what the author has said. This is probably true because the rapid rate forces the reader to attend more intensely to the meaning of the selection read and to the word as a whole. It also tends to force the reader to select and carefully observe the more important words in the sentences and so enables him to better understand and remember what he has read.

The great and growing need for faster reading and the equal demand for accuracy of comprehension and the constant need for using the facts obtained from magazines and books, makes it important to inquire how the higher-orders of perceptual habits in reading, which make this increase of speed and accuracy possible, may best be developed. We should also try to determine the kind of stimulation and direction that is required to enable learners of this subject to solve this problem in the most successful and economical way. The first of these problems is treated in the remaining sections of this paper. The latter problem will be discussed in the fourth and last paper in this series on the Analysis of the Task of Learning to Read.

(*3*) *How to Increase a Pupil's Reading Rate.*—The ability to read rapidly and more efficiently is dependent in the last analysis upon the correct recognition and accurate apprehension of the language symbols observed, for there can be no real gain in speed without a corresponding gain in accuracy of comprehension. The development of the perceptual habits which make such increases in reading skill possible is dependent upon a number of things that may be controlled by a teacher wholly or in part.

[13] Curtis, J. N., and Whipple, G. M. "Preliminary Investigation of Skimming in Reading," *Journal of Educational Psychology*, VIII, pp. 333-339.

1. Greater efficiency in reading rate depends in the first place upon the development of proper eye habits and eye controls. Without this the printed language symbols could not be accurately observed or correctly interpreted. The development of the eye habits needed to observe the words correctly may be facilitated by the use of suitable materials in the different grades and by seeing that this material is printed in appropriate form so that it may be properly adjusted to the eye control that has already been developed by the learners. Considerable practice on familiar material would aid the development of these necessary eye-habits.

2. There must also be a mastery of the individual words. One of the necessary prerequisites for increasing the rate of reading consists of perfecting the elemental perceptual habits involved in recognizing and interpreting the words. Greater familiarity with words, especially with their meaning, would, therefore, help a learner in handling the language symbols in a way that would enable him to increase his reading rate. Special drill on the words whose correct interpretation slows down the perceptual process should, therefore, be given.

3. Conditions must also be arranged so that the learner will develop the perceptual habits used by the most efficient readers. The development of these higher-orders of perceptual habits is aided by using material for the practice which the learner can readily interpret or understand because it is well adapted to his interests and intellectual needs. Attending more carefully to the meaning of what is read makes it easier to combine words into their normal thought units. Such a series of words soon comes to be recognized and interpreted as a whole and just as easily as a single word. This makes it easier for the learner to select the more important words in a sentence and, at a later stage, the key sentences in a paragraph, a procedure that is absolutely required to develop the highest order of perceptual habits.

4. The motorization of the words, so universally used in oral reading and so generally employed to help the learner in linking the proper meaning response to the printed words in the earliest stages of learning to read, *must be entirely eliminated* before the highest speed in reading can be attained. Articulation of the words, actual or incipient, prevents the use of the higher forms of recognition and interpretation employed by the best silent readers to-day. Experiments have shown that the habit of pronouncing the words can be eliminated by the right kind

of direction and practice. It would be better, of course, if these habits had never been formed.

5. Greater familiarity with the fundamental language forms would also assist learners in developing their perceptual habits. Special drill on the various sentence forms and practice on the more fundamental grammatical constructions used in the sentence would, therefore, greatly assist the learners in recognizing and interpreting these language symbols more rapidly and correctly. These different sentence forms should be observed in a paragraph setting.

6. A certain amount of practice in reading for speed is necessary to increase the learner's reading rate. All learners must be forced to leave behind the elemental habits and simpler ways of observing words as rapidly as more complex and economical methods of observing them can be successfully used. Such practice should, however, be taken on materials that are familiar as to context, so that getting the meaning from the selection would present less difficulty to the learner and would not be slighted. If this were done, the learners could devote their entire attention and energy to increasing their perceptual span instead of devoting some of it to the problem of extracting the meaning from unfamiliar words.

Forcing oneself to read more rapidly than one's customary rate may at first interfere with proper comprehension, but in the course of persistent practice, the more economical ways of observing the language symbols will be discovered and practiced until they will become habitual. Lower-order methods of perceiving the language symbols will be discarded in favor of the higher and more economical ones; and, if a part of the practice is taken to insure accuracy of comprehension, the ability to understand what is read will soon be equal to or greater than it was before, notwithstanding the increase in speed of reading which has been forced by this method of practice. One thing is certain; all learners must be stimulated and encouraged to handle larger language units in this unitary way if they are ever to acquire the ability to read more rapidly and efficiently.

Most adults and many children read far more slowly than they are capable of reading, and experiments have shown that speed in reading depends chiefly upon the ease with which the meaning for *groups of words* arises in the reader's mind. The latter is dependent upon the ease with which the words can be combined into the larger language units rather than upon the ease and rapidity with which individual

words can be recognized and correctly interpreted. The materials used for the practice must, therefore, be printed in a way that will stimulate the development of these higher forms of perceptual habits. The reading texts might, for example, be printed with the key words in a sentence underscored or printed in italics. As the learning progressed, the key sentences in the paragraph should be similarly designated. In some such manner the readers could be helped in learning to select the particular language units to be most accurately observed. If this were done for the different school grades, beginning with the fourth or fifth grade, and if the materials used for the reading practice were carefully adjusted to the learner's ability to combine and recognize these language units, the learners of this subject would not only be stimulated to *develop* these higher-order habits, but they would be given successful *practice in the use* of the exact type of reading habits that must be established to learn to read most effectively. This practice and experience in controlling the perceptual processes involved in reading is probably the greatest single help that could be given to learners of this subject.

(*4*) *How to Improve One's Ability to Comprehend What is Read.*—As already pointed out, speeding up the rate of reading tends to stimulate greater concentration of attention upon the meaning or content side of what is read. Numerous experiments have shown that both speed and accuracy may be improved by practice if carried on with the intention of making improvements in these particular respects. Without the *intention* to improve, mere practice in reading will not bring about greater ability either to read more rapidly or accurately.[14]

It should, however, be remembered that the ability of a pupil to get the correct meaning from a printed page is dependent upon his previous experience, his mental maturity and strength, and upon his power to think. This makes it imperative that the materials used for the practice in reading must be well adapted to the learner's experience, mental capacity, and to his intellectual needs. If proper attention were given to the selection of suitable reading materials, the problem of improving the pupil's ability to read could be much more easily solved. A number of specific suggestions for those who are trying to help learners improve their ability to interpret and understand what is being read were described in a preceding paper on the "Analysis of the Task

[14] Book, W. F. *Learning How to Study and Work Effectively*, Chapter XVI, pp. 308-311; also Book, W. F. "The Will to Learn," *Pedagogical Seminary*, XXIX, pp. 302-362.

of Learning to Read." These suggestions may be restated here somewhat as follows:

1. Select material that can be understood and interpreted by the learners.

2. Arrange matters so that the children will read and work with the *intention* of getting the thought, or will understand of what the author has said.

3. Develop in the learners the habit of looking for the essential ideas encountered in the material read.

4. Encourage the learners to stop frequently in order to recall the more important points which the author has made.

5. Give frequent tests to determine the pupils' reading ability and keep a record of their score both in speed and accuracy. This knowledge of success will stimulate the pupil to greater effort. It will also make him seek improved methods of work and will make it possible for him to select things to do that will lead to still greater and continued success.

(5) *Some Difficulties Encountered in Developing Higher-Orders of Perceptual Habits.*—A study of the eye movements used by poor and good readers and a comparative study of their methods of work have indicated some of the more important difficulties that must be overcome by learners of this subject.

1. The first of these difficulties arises from the imperfect automatization of the word-recognition habits. A series of words cannot be combined and treated as a unit by a reader in interpreting a printed page, until the individual words or language elements which make up this larger unit are sufficiently familiar to be thus combined. This familiarity with individual words makes it possible not only to recognize these words more quickly and easily, but to combine them into larger perceptual units and to link the proper meaning to these units more promptly and surely. It is the ability to combine these words while in the act of observing them that enables the reader to increase his reading rate, and his ability to observe these higher language units is dependent in part at least upon his familiarity with the words which compose them.

2. Imperfect automatization of phrase and sentence recognition habits causes trouble if the reader attempts to read too fast. Greater familiarity with certain phrase and sentence types would, therefore, aid in the development of the higher perceptual habits. Some special practice might even be given to observing the more difficult combinations of

words and certain sentence forms, since a greater familiarity with these language units would greatly facilitate the reading process. The advantage of this type of practice is indicated by the greater ease and rapidity with which an author can be understood if the reader is thoroughly familiar with his style.

3. A learner may be so satisfied with his attainments in reading or with his ability to observe the printed words that he will not put forth sufficient effort to progress beyond the stage of skill already attained. This would retard his progress because it requires special effort to develop a higher-order habit and to successfully discard any method of work if this method already serves the reader's purposes fairly well. Eliminating the elemental habits used in the early stages of learning as rapidly as higher-order habits can be used, therefore, presents very serious difficulties to all learners of this subject. The natural tendency for a reader is to continue to observe letters, syllables, or words, instead of pushing ahead and learning to observe these language symbols by selecting the key words in a sentence and the most important sentences in a paragraph. Special incentives must be provided by the teacher to eliminate these elemental habits in the learner by forcing him to use the highest-order of perceptual habits that he is capable of using.

4. Lack of confidence that further progress is possible in speed or in the correct comprehension of what is read will also retard the development of the habits which give the learner greater skill. This is an important point that can and must be corrected by the teacher as the author has elsewhere pointed out.[15]

5. Insufficient knowledge of exactly what he must do to attain a higher level of reading skill may retard a pupil's progress while learning to read. He may not know that his word vocabulary is too meager to attempt to read more rapidly. He may not know that he should select and emphasize certain words in the sentence. He may not know that he must eliminate certain elemental habits like pronouncing the words or observing each word in detail. All learners of this subject must, therefore, be helped to discover what they should do to continue to improve. They should be shown or led to discover for themselves how these things can best be done.

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[15] Book, W. F. "The Will to Learn," *Pedagogical Seminary*, XXIX, (1922), pp. 305-362; also *Learning How to Study and Work Effectively*, Boston: Ginn & Co., 1927. pp. 308-335.

6. Undue haste or trying to speed up the reading process by the use of a higher-order reading habit than can be successfully used is sure to retard the learner's progress since it will produce many mistakes that must be eliminated by special care and practice before the correct reading habits can be successfully developed. Special practice for accuracy or with emphasis placed on getting the meaning of the selection read would tend to correct this mistake.

7. The necessity for eliminating habits which were formed and used in the preliminary stages of the learning as mere crutches (like getting the meaning of the words by pronouncing them) presents a serious difficulty to learners of this art. In fact, the habit of articulating the words, which was used in oral reading to arouse the meaning of the words, cannot be successfully eliminated in silent reading except by developing in its stead the habit of getting the meaning from the printed words direct as a visual sensation.[16]

It will, therefore, be found to be much easier to establish the correct reading habits in the first place than to try to substitute them for habits that were previously used as an aid for arousing the correct meaning responses. The writer, for example, has never been able to satisfactorily eliminate the habit of pronouncing the words so firmly established by the ABC method he used in learning to read. As a natural consequence, his silent reading is painfully slow and much too inefficient to meet his present needs.

Other tendencies to error and mistakes that normally occur should be noted by all teachers of this subject and either prevented or overcome, since facts of this sort can be used by him to indicate the kind and amount of direction which learners of this subject really need.

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[16] Compare Sections 2 and 3 of the preceding paper in this series, "Various Methods of Learning to Master New Words While Learning to Read." *Journal of Educational Research*, XXI, (February, 1930), pp. 81-94.

A STUDY OF THE SPECIFIC ILLEGIBILITIES FOUND IN THE WRITING OF ARABIC NUMERALS

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THE purpose of this study was to attempt to determine (1) whether or not any certain written Arabic numerals tend to be misread more frequently than others; (2) whether or not—in the writing of the Arabic numerals—certain illegibilities appearing in the elementary grades tend to persist with increasing age, and (3) whether or not the results of such a study would point to any definite remedial teaching procedures that might reduce materially the number of illegibilities.

Materials.—The materials used in this study consisted of the following: (1) one regular daily arithmetic paper from each of 128 different pupils in Grades III-B (lower half of grade) to IV-A inclusive; (2) some regular daily arithmetic papers of 159 different students in Grades VII-B to IX-A inclusive, and (3) a sampling of adult handwriting which included (a) 1,583 sales slips of about 50 different clerks, covering an average day's trade in a department store, (b) 852 personal checks written by some 750 different persons, and (c) 1,430 luggage check reports of about 40 different drivers of a bus transportation company. In all, more than 135,000 digits, which were written by some 1,127 different persons, were read in making this study. Not over ten percent of the material was written in ink.

The types of school material covered included examples in addition, subtraction, multiplication, and long division for the elementary grades, while the material of the junior high school level included the solution of problems in mensuration, interest, and work in algebra such as the removal of parentheses and substitution. Practically 10,000 digits from each grade were analyzed.

Method.—The material was read over by the writer who considered illegible anything that required a second glance to determine what number was meant. As the various kinds of illegibilities were found, they were copied on a tally sheet and a tally mark made for each time such an illegibility occurred.

An important feature of the investigation was the fact that no material was used which could not be checked objectively in order to determine just what number was intended by the writer. In the school papers, the examples and problems could be worked out, thus providing

a definite check as to what was intended. The totals on the sales slips could be compared with the cash register's stamp at the top of the slip (this was not referred to unless an illegibility was found); any illegibility occurring elsewhere than in the total of the bill could be checked from the total back to the costs of the various items. The numbers on the personal checks were read by thumbing through the bunches of checks and looking only at the numerical statement of the amount; when an illegibility was encountered, the written statement of the amount was referred to. The numbers found on the bus drivers' reports of the luggage checks could be verified by referring to the report for that particular bus by another driver on some other date.

The results from the study of each group's writing were recorded separately, and were later combined into the general age-groups of "elementary," "junior high," and "adult" for convenience in making age comparisons, and also in order that the writing of any one type of material of writing under certain conditions would not unduly affect the results.[1] Since the number of digits analyzed did not remain the same for each group studied, the actual frequencies of the various forms of illegibilities or illegibility-types were transmuted into frequencies per ten thousand digits. There was then determined for each age-group the median frequency per ten thousand digits for each illegibility; this median was used to characterize the frequency of that illegibility for that age-group. Similarly, the total number of illegibilities was also determined for each digit, for each age-group, and for the whole study. From these data, the relative importance of each kind of illegibility and illegibility-type—on the basis given above—was determined for each age-group and for the total of the age-groups combined.

In the attempt to determine possible remedial procedures certain specific illegibilities were combined into definite type-illegibilities. For instance, in writing the numeral "7," three movements are usually made—the first, a short downward stroke, or loop, followed by a longer horizontal line, and then a still longer down-stroke. All forms of illegibilities which apparently resulted by exaggerating the size of the first short downward stroke, or loop, were combined, since remedial work on these illegibilities would center upon this phase of writing a "7." The

[1] The method as a whole was fundamentally the same as that used by S. L. and L. C. Pressey of Ohio State University in their study of the specific illegibilities in the writing of letters: "Analyses of Three Thousand Illegibilities in the Handwriting of Children and Adults." *Educational Research Bulletin*, VI, (September 28, 1927).

same kind of combination was made of the illegibilities resulting from making improperly the initial movement of the numeral "2." In the case of the "5," those illegibilities resulting from the inaccurate placing of the finishing dash were later considered as a type-illegibility. A similar type of procedure was followed with "6," and "9," and also certain groups of numbers whose illegibilities seemed to result from their being written in a group.

Reliability of the Method Used.—A rough indication of the reliability of the method used was obtained by having twenty-one college students (of whom two-thirds had had teaching experience) in a course of educational measurements check over twenty-four third-grade papers. The students worked independently, recording on a separate sheet of paper each illegibility they found, and tabulating the frequency with which it occurred. It was stressed that readability, and not perfection of form, was the criterion to be used. The comparisons could be made only roughly, since the material collected showed marked variations in the recording of illegibilities. In certain cases, in spite of the instructions given, only the frequency of the illegibility was noted, no indication being given of the form of illegibility.

Since it was found that out of the 131 estimates made thirty-one estimates on thirteen different papers agreed completely with the writer's results as far as the *forms* of illegibilities were concerned, and that twenty-seven other estimates showed the same forms of illegibilities that the writer had noted, but added some others, the indication would seem to be that the writer's results were fairly conservative. As a whole, the checking group tended to disagree with the writer mainly by adding to his results; in sixty-nine specific instances of kinds of illegibilities, the checking judges did not consider as illegible certain numerals so analyzed by the writer, and in 126 instances the checking judges indicated certain forms of illegibilities not noted by the writer. A median frequency of the total numbers of illegibilities found on each paper by the three or more judges was determined and correlated with the total number of illegibilities found on these same papers by the writer. The coefficient thus obtained was $+.75 \pm .06$, suggesting a fair amount of reliability as measured by that criterion. It would not seem presumptuous, then, to say that if a similar study were made for verification purposes, there would be a fair amount of agreement.

Frequencies of Illegibilities.—From Table I it can be seen that in the third and fourth grades, illegibilities occur some two times per one

hundred digits. Junior high pupils tend to write numerals illegibly somewhat less than two times per one hundred digits, and adults write about four out of every one hundred Arabic numerals illegibly.[2] One wonders if the increased demand for speed would help to account for the greater illegibility on the part of the adults.

TABLE I

GROSS FREQUENCIES OF ALL ILLEGIBILITIES PER TEN THOUSAND DIGITS

Digit	Elementary Group Median	Junior High Group Median	Adult			Median of the Three Age-Groups
			Bus	Bank Checks	Sales Slips	
0	16	17	9	246	64	17
1	2	1	5	—	7	2
2	20	17	20	43	46	20
3	10	1	12	37	18	10
4	26	26	9	7	20	16
5	33	86	39	170	256	86
6	45	5	13	20	4	13
7	31	27	20	17	49	27
8	27	9	14	10	34	14
9	15	2	7	20	69	15
Group	—	—	8	7	143	—
Total	225	181	Median = 384			220

For the whole study, "5" seems to be the demon digit; it has an illegibility frequency of about one per 125 digits. The digits "7" and "2" are the next most frequently illegible, being so written about once in every 500 digits. The frequency with which "5" is illegibly written by adults may be partly a result of its great illegibility frequency on the sales slips (256 illegibilities per ten thousand digits). The results assume still more significance since these slips were obtained from a store where articles are marked to sell at 29c, 49c and 98c rather than at 35c, 50c and $1.25.

[2] In reading this table, four points should be remembered: (1) The frequencies shown here, as well as elsewhere, are in terms of appearance per ten thousand assorted digits; no record was made of the actual frequency with which the separate digits occurred. While such a tabulation would, of course, be very helpful for certain phases of a study of this sort, it was not considered to be of any great value in getting a picture of the practical situation as regards the incidence of different illegibilities. (2) The high frequency of illegibility for "0" in the bank-check writing of adults is probably due to a large extent to the frequency with which zeros occur as compared with the frequency of the other digits. Since some of these checks were written by the clerks at the bank and since these clerks tend to make their zeros—especially when they occur together—like small "c's," this element would tend to increase the frequency of "0" illegibilities. (3) It may have happened, also, that "5" appeared on checks more frequently than did any other digit. (4) Then, too, the extent to which people depend upon the written verbal statement of the amount of a check to supplement their written numerical statement of the amount cannot be stated, but this factor may have influenced their writing of the numbers.

TABLE II

MEDIAN FREQUENCIES PER TEN THOUSAND DIGITS FOR THE DIFFERENT FORMS OF ILLEGIBILITIES AND ILLEGIBILITY-TYPES FOR EACH DIGIT

Digit		Illegibility	Elementary	Junior High	Adult	Median Frequency
0	like		9	10	7	9
	"		..	..	27	4
	too narrow		..	..	5	..
	Misc.		8 (5)	7 (3)	8 (3)	6 (3)
1	Misc.		2 (2)	1 (1)	3 (2)	1 (1)
2	like		15	8	7	8
	"		..	5	..	4
	"		..	..	8	..
	"		..	..	5	..
	Misc.		5 (5)	..	12 (5)	5 (4)
3	like		4	..	..	..
	Misc.		5 (4)	1 (1)	12 (5)	2 (2)
4	like		7	5	..	5
	"		6	..	..	..
	"		..	6	..	..
	"		5	..	..	4
	"		3	..	..	..
	Misc.		2 (4)	10 (5)	5 (3)	4 (5)
5	like		20	91	66	51
	"		..	6	23	6
	"		..	..	30	..
	"		..	..	13	..
	"		..	..	7	..
	Misc.		12 (10)	9 (6)	4 (2)	11 (7)
6	like		30	..	10	10
	"		9	..	..	..
	"		5	..	..	..
	Misc.		2 (1)	2 (2)	1 (1)	2 (2)
7	like		28	15	..	15
	"		..	..	8	3
	Misc.		3 (3)	8 (3)	6 (3)	2 (1)
8	like		14	..	..	..
	"		4	5	..	4
	too narrow		4	..	..	..
	Misc.		7 (6)	4 (2)	10 (4)	5 (4)
9	like		..	..	13	3
	"		5	..	..	..
	"		5	..	..	..
	"		..	..	5	..
	Misc.		7 (3)	1 (2)	2 (2)	3 (2)

NOTE—The illegibilities shown specifically in this table constitute practically three-fourths of the total number of illegibilities found; the remaining one-fourth consist of the ones marked as miscellaneous. This latter group have a frequency-per-ten-thousand of not over, and mainly less than, three.

Distribution of Illegibilities.—When the results from the different levels are compared it appears that all numerals but "5" decrease in frequency of illegibility from the elementary to the junior high-school level; the numeral "6" decreases most, with "8" next. From the junior high to the adult group, only "4" and "7" show any decrease in illegibility. All the other eight numerals show some increase in illegibility; for "5," "0," and "2" the increase is marked.

In the elementary group, 19 different forms of illegibilities distributed among nine numerals make up practically 75 percent of the total number of illegibilities. Contrasting the junior high with the elementary group, the data on the latter show that 12 forms of illegibilities are distributed among six numerals. In the adult group, however, 16 different kinds of illegibilities scattered among six numerals make up, roughly, 75 percent of the total illegibilities in that group.

Writing "6" in four different forms makes up 19 percent of the total for the elementary group. Illegibilities of "7" constitute over 12 percent of the total, and all of these may be attributed to the first short downward stroke, or loop, of the "7." The numerals "4," "8," and "5" each make up roughly 10 percent of the total number of illegibilities for this group.

In the junior high group, "5" constituted 50 percent of all the illegibilities, the top horizontal dash of this numeral causing practically all this trouble. The short down-stroke, or loop, of the "7," mentioned above, stands out here again and accounts for about 8 percent of the total.

TABLE III

NUMBER OF KINDS OF ILLEGIBILITIES MADE BY EACH PERSON

Number of Kinds of Illeg.	Grade 3	Grade 4	Grade 7	Grade 9	Sales Slips	Total
8	1*	—	—	—	—	1
7	—	—	—	—	—	0
6	2	—	1	—	—	3
5	2	2	—	2	—	6
4	5	5	5	4	1	20
3	13	3	9	8	9	42
2	12	17	20**	9	12	70
1	19	20	26	17	11	93***
0	11	16	7	9	3	46
Total	65	63	68	49	36	281

*This would mean that one out of 65 third-grade pupils was considered to have eight different illegibility habits.

**This would indicate that 20 out of 68 seventh-grade pupils each made two kinds of illegibilities.

***This would read, then, that 93 out of 281 different individuals each had one illegibility habit.

As for the adult group, the numeral "5" written in six different forms makes up 46 percent of the total illegibilities, accurate placing of the horizontal dash on the top of the "5" constituting about one-half of these illegibilities. Writing the numeral "0" in three forms constitutes 13 percent of the total of the adult illegibilities.

Frequency of Illegibility-Habits Among Individuals.—A reasonably adequate sampling of the material used in this study leads one to conclude that the greatest number of individuals in any group tends to make from one to two kinds of illegibilities. Table III shows this very clearly.

Remedial Implications.—In considering remedial or preventive work, four specific points stand out. It is to be noted that doing away with the short downward stroke, or loop, used in beginning to write a "7" or a "2" might be expected to decrease the illegibilities of the elementary group by 19 percent, those of the junior high group by 12 percent, and those of the adult group by about 4 percent. The writer had expected that this same stroke also found in writing a "3" would create a serious enough situation so that all such movements could be discarded. Such, however, was not the case. Perhaps from a teaching standpoint such a generalization might as well be made even though it may not be substantiated by the findings of this study.

The reverse method of writing the numeral "5" (writing the dash first, from the right to the left and then making the rest of the "5") would probably greatly improve legibility in all age-groups since the illegibilities resulting from the inaccurate placing of the dash account for 9 percent of the total in the elementary, 47 percent of the junior high, and 22 percent of the adult group. It is the writer's experience, however, that this method of writing a "5" appears only sporadically. Evidently this manner results from some idiosyncracy of different individuals, since a survey of 23 different current handwriting systems showed a complete absence of the suggested remedial procedure in connection with writing a "5." There is a possibility that this method is used by certain librarians, since the suggestion is made by Dana (referring to a rule in the handbook of the New York State Library School) to the effect that all figures are to be made "without lifting the pen."[3] But even then, it is not consistently done.

[3] Dana, John Cotton. *A Library Primer.* (Chicago: Library Bureau, 1900), page 72.

A third implication, based partly upon the results shown in Table III and also upon the fact that some 146 different forms of illegibilities were noted in this study, is to the effect that remedial work will probably need to be essentially individual in nature.

Finally, there is a possibility that the construction of a diagnostic chart for the analysis of written Arabic numerals would be helpful. This would parallel very closely the one constructed by the Presseys for handwriting.[4] By means of a chart of this sort, a teacher could tabulate the forms of illegibilities peculiar to the different pupils and adapt her remedial work accordingly, both as far as the individual youngster and the class are concerned.[5]

Discussion.—Certain attempts in accounting for conditions which this study has shown to exist are certain to appear; additional problems or ramifications of the present investigation also suggest themselves. A few of these might be briefly mentioned. From the evidence concerning the persistence of certain kinds of illegibilities, those of the elementary group can hardly be entirely accounted for on a basis of poor muscular control; a large part of it may be due to the attempt to write unnecessary ornaments on numerals, or to poor methods of teaching the formation of the numerals. Apparently, speed affects legibility—especially as shown by the frequency of illegibilities on sales slips. The remedial suggestions, with regard to the writing of "7," "2," "5," made in this article should be tried out experimentally to see if they will help matters, or only create other less desirable conditions. It might also be desirable to construct a legibility scale for numerals similar to those now in use for the purpose of rating the quality of handwriting.

Conclusions.—From the study as a whole, the following conclusions may be drawn:

(1) Adults write Arabic numerals illegibly about four times out of a hundred, or about twice as frequently as do either the elementary or the junior high-school pupils.

(2) Certain Arabic numerals tend to appear illegible quite frequently in writing. In decreasing order of frequency, "6," "5," and "7" are so written by the elementary group; "5," "7," and "4," in the junior high group; and "5," "0," and "2" in the adult group.

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[4] Pressey, S. L., and L. C. *Chart for Diagnosis of Illegibilities in Handwriting.* Bloomington, Illinois: Public School Publishing Co.

[5] Such a chart is being prepared by the writer, and will be available soon.

(3) Certain numerals—"5," "0," and "2"—are found written illegibly with increasing frequency as one goes from the elementary to the adult level. Here, presumably, the element of speed affects legibility. The numeral "4" appears illegible less frequently with increasing age.

(4) Specific kinds of illegibilities do tend to persist in the different age-groups; the disturbing elements of the "7," "2," and "5" are instances of this condition.

(5) Definite remedial procedures seem to be suggested especially in the teaching of writing the "5" by the reverse method as described by the writer. Most surely, in the school levels especially, the ornamental downward strokes, or loops, made in beginning to write a "7" or a "2" could well be eliminated. Such a type of procedure would help also in the adult's writing of "2."

THE USE OF PRACTICE EXERCISES IN TEACHING CAPITALIZATION AND PUNCTUATION

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THIS study is concerned primarily with the effect of practice exercises on learning to punctuate and to capitalize. The central problem is to determine whether the use of practice exercises in the nature of proof-reading, error correction, and dictation improve the pupils' abilities to write compositions that are free from punctuation and capitalization errors.

TECHNIQUES AND SET-UP OF THE EXPERIMENT

In the spring of 1928 the author selected eighty-two pupils from the eighth and ninth grades of the Ethical Culture School, New York City, as subjects for this study. Each pupil was given the Terman Group Test of Mental Ability, the Pressey Diagnostic Tests in English Composition for Punctuation and Capitalization, and the Leonard Proofreading Test in Punctuation. The last test mentioned was a proofreading test with four forms constructed by the author to measure each of twenty-eight rules of punctuation and capitalization. From the results of these tests a composite score was calculated for each pupil, by the McCall technique,[1] and the pupils paired into an experimental and a control group for each grade level. Following these tests each pupil was directed to write four compositions and one social letter.

Twenty-eight rules of punctuation and capitalization were selected for teaching. Each lesson was mimeographed and taught to the pupils of both groups in eleven forty-five minute periods. In addition to the regular mimeographed lesson sheets the experimental groups received special practice exercises in proofreading, error correction, and dictation.[2] Twenty-five minutes of each period were devoted to these exercises. The control groups followed the more conventional methods of teaching, such as picking out punctuation marks from paragraphs and citing the rules for their use, writing compositions and reviews of books and plays, and formulating sentences to illustrate certain rules.

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[1] McCall, William A. *How to Experiment in Education.* (New York: Macmillan Co., 1926), pp. 51-55.

[2] For complete discussion of methods used, the reader is referred to: Leonard, J. Paul. *Practice Exercises in Teaching Punctuation and Capitalization.* Teachers College Contributions to Education. Teachers College, Columbia University. No. 372. 1929.

At the close of the eleven teaching periods the Pressey Diagnostic Tests in English Composition for Capitalization and Punctuation; Leonard Proofreading Test in Punctuation; Error Correction Test; and a Dictation Test were given to all of the pupils. The error correction test was devised by the author from an excerpt of 1350 words of Robert Louis Stevenson's "Sire de Maletroit's Door." It was punctuated incorrectly providing 231 possible corrections in punctuation and capitalization. The dictation test was composed of material taken from a short talk by Mr. Herman Hagedorn. An average of 500 words of this material was read to each pupil, who was required to write and to punctuate it correctly. Three compositions and two letters, written at the close of the experiment, were also analyzed for errors.

Since the chance of errors entering into the scoring of children's compositions increases proportionately with the number of details considered, it was necessary to limit the field to fewer items. One-hundred twenty-five compositions were scored for violations of all the twenty-eight rules taught, and all of the compositions were scored for violation of the eleven following rules: terminal period; beginning capital; capitalization of proper nouns; no capitalization of common nouns; question mark with interrogative sentences; comma before "and" when used in a series; comma with words, phrases, and clauses in series; commas with words used parenthetically; commas with phrases and clauses used parenthetically; apostrophe with contractions; and apostrophe to indicate possessives of nouns.

In all, 820 compositions representing a total of 172,981 words were scored for violations of the preceding rules. The papers were scored for (a) the number of opportunities to use the above rules of punctuation, (b) the number of cases in which the punctuation was used incorrectly, and (c) the number of times punctuation was omitted. Incorrect and omitted marks were added together to represent what are called errors in this study. A percentage of error for each pupil was then obtained by dividing the number of errors by the number of opportunities for committing the error.

The author is conscious of the fact that this method of scoring does not account for differences between misused punctuation and capitalization, which may be due to ignorance, and, omitted punctuation and capitalization which may be due to carelessness. As the aim of English teachers, however, is to eliminate both types of errors, and the present

study seeks to determine the effectiveness of practice exercises in doing this, the method employed seemed to be acceptable.

THE RESULTS

It is apparent from Table I that the gross mean gains in favor of the experimental groups are rather large in all cases except for the Pressey tests in the ninth grade. The following formula was applied to the results of the tests to determine the standard deviation of the difference between the mean gains for each grade level.

$$S\,D_{diff.} = \sqrt{\frac{(SD_1)^2}{N} + \frac{(SD_2)^2}{N}}$$

TABLE I

MEAN GAINS ON TESTS MADE BY THE EXPERIMENTAL AND CONTROL GROUPS IN GRADES EIGHT AND NINE AS A RESULT OF ELEVEN TEACHING PERIODS

Tests	Actual Mean Gains Grade 9		Mean Differences in favor of Experimental Group	Actual Mean Gains Grade 8		Mean Differences in favor of Experimental Group
	Experimental Group	Control Group		Experimental Group	Control Group	
Leonard Proofreading	20.10	14.12	5.98	34.50	23.55	10.95
Pressey Punctuation	4.64	4.39	.25	7.20	4.46	2.74
Pressey Capitalization	2.50	2.97	—.47	4.20	2.75	1.45
Correction of Error			7.98			35.50
Dictation	6.82%	5.09%	1.73%	12.39%	9.27%	3.12%

NOTE—Scores on the Leonard and Pressey tests represent the number of correct responses. Scores on the correction of error test represent the number of errors made, hence the low score is the best one. Scores on the dictation test are in terms of percentage of error.

TABLE II

MEAN DIFFERENCES IN FAVOR OF THE EXPERIMENTAL GROUPS ON EACH TEST, THE STANDARD DEVIATIONS OF THESE MEAN DIFFERENCES AND THE RATIO BETWEEN THEM AND THE STANDARD DEVIATIONS OF THEIR DIFFERENCES

Tests	Mean differences in favor of experimental group		Standard deviations of differences		Ratio of standard deviations of differences to mean differences	
	Grade 8	Grade 9	Grade 8	Grade 9	Grade 8	Grade 9
Leonard Proofreading	10.95	5.98	4.47	3.02	2.46	1.98
Pressey Punc.	2.74	.25	1.01	.83	2.75	.30
Pressey Cap.	1.45	—.47	.94	—.52	1.54	—.91

The ratios between the standard deviations of the differences and the mean differences on the results of the Leonard Proofreading test for both grade levels and on the results of the Pressey Punctuation test for the eighth grade are high enough to be statistically significant in favor of the practice exercises. The results are less significant in the case of the Pressey Capitalization test for the eighth grade but are in the direc-

tion of the experimental groups. The ratios for the Pressey Capitalization and Punctuation tests in the ninth grade show no significant trends in either direction. One is struck by the general trend of the results in favor of the experimental or practice groups for both grade levels.

The results given in Table III are in terms of percentages of error. This table shows the mean percentages of error made by the two groups in both grades on the compositions written at the beginning and at the end of the eleven teaching periods.

TABLE III

MEAN PERCENTAGES OF ERROR MADE BY ALL PUPILS ON THE COMPOSITIONS WRITTEN AT THE BEGINNING AND END OF THE EXPERIMENT

Groups	Mean Percentages of Error made on Compositions written at: Beginning of Experiment	Mean Percentages of Error made on Compositions written at: End of Experiment	Decrease in mean percentages of error as result of teaching
Experimental Grade 8	9.95	3.05	6.90
Control Grade 8	10.01	6.13	3.88
Experimental Grade 9	8.23	2.26	5.97
Control Grade 9	6.74	4.21	2.53

Table IV shows the decrease in mean percentages of errors as a result of the eleven teaching periods together with the standard deviations of these differences and the ratios between these differences and their standard deviations. The following formula for the standard deviation of the difference where the correlation is available was applied to the actual mean differences in each group.

$$S\,D_{diff.} = \sqrt{\frac{(SD_1)^2}{N} + \frac{(SD_2)^2}{N} - 2\,r\left(\frac{SD_1}{N}\right)\left(\frac{SD_2}{N}\right)}$$

TABLE IV

DECREASE IN MEAN PERCENTAGES OF ERROR FOR ALL GROUPS AS A RESULT OF TEACHING; STANDARD DEVIATIONS OF THESE MEAN DECREASES, AND THE RATIO OF THE STANDARD DEVIATIONS OF THESE DECREASES TO THE MEAN DECREASES

Groups	Decrease in Mean Percentage of Error	Standard deviations of Mean Decreases	Ratio of standard deviations to Mean Decreases
Experimental Grade 8	6.90	.88	7.89
Control Grade 8	3.88	1.14	3.40
Experimental Grade 9	5.97	.73	8.20
Control Grade 9	2.53	.62	4.07

The mean decreases in both the experimental and control groups for each grade level are statistically significant. Profitable teaching was going on in both groups, but the mean decreases made by the experimental groups were twice those made by the control groups. These results would seem to indicate that the practice exercises were decidedly more

economical and effective in teaching punctuation and capitalization to these pupils than the conventional method.

When one reflects upon the nature of the exercises employed in this study, he realizes that the psychological process underlying proofreading and error correction is different from that involved in writing one's own sentences free from errors. If the two exercises—proofreading and original writing—are different psychological processes, then transfer has taken place to produce the large gains made by the experimental groups. Unless this be true the pupils could not have learned to punctuate their own compositions by practicing upon proofreading and error correction exercises. If transfer has not taken place, there is then a decided relationship between ability to proofread and ability to write correctly. Evidence seems to show that the processes are different, which, if true, leads us to conclude on the basis of the findings in this study that there is a transfer from these types of exercises to writing compositions.

PERSONALITY DEVELOPMENT IN STUDENT-TEACHERS

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THE development of superior personality in student-teachers has recently become a new objective in the training of teachers. Several teacher-training institutions have discovered that the majority of failures among our beginning teachers are clearly traceable to personality defects.[1] Many a young teacher who has successfully passed the required professional courses is labeled a failure by those who judge her teaching, because he lacks forcefulness, sociability, a business like manner, or some other essential trait.[2] Consequently, certain progressive schools, after studying carefully the teaching records of their graduates, have considered it desirable to make a special effort to eliminate personality defects.

This emphasis on character building in student-teachers is praiseworthy, since the need is so evident. But while the need is evident, the *method is not*. Personality is a complexity of desires and abilities in delicate adjustment, and it is, therefore, no simple matter to tear out old traits, or to insert new ones. While the professor of education is tinkering with forcefulness, the student's friendliness may get out of kilter. All the good qualities of a student-teacher may be seriously injured if one or more of his traits are attacked too directly. Personalities must be enriched and characters strengthened, but the present method of accomplishing this is questionable.

The Iowa program described by Lancelot offers a typical example of the direct method. First, a list of essential traits is secured by analyzing the activities of successful teachers. Plans are laid to insure the development of these desirable traits in every student-teacher. The students realize by readings and discussions early in the training course, the importance of certain personality traits for success in teaching. A hearty and unanimous "Yes" is voiced in answer to the question: "Would the benefits that would come from a superior personality repay a college student expecting to teach for the effort necessary to attain

[1] Lancelot, W. H. "Developing Student-Teachers in Traits of Personality," *Educational Administration and Supervision*, May, 1929, p. 356.
[2] Charters, W. W. *The Teaching of Ideals*, pp. 67-75, 190.

it?"[3] While the trainee is still filled with enthusiasm for expanding his personality, an individual analysis will expose his weaknesses to him. The faculty committee promptly provides a list of activities designed to develop each defective trait. So, throughout the rest of his training course, the student devotes a portion of his time and attention to making definite, desirable changes in his personality.

The outstanding characteristic of this method is its directness. Each student aims consciously and directly to attain a superior personality. Furthermore, each trait becomes the object of a specific, direct attack. If a student is short in friendliness, or if he lacks ambition or good judgment, the plan has certain practical exercises for these. This directness stands in striking contrast to the more or less vague benefits often claimed for "the atmosphere of our college." Whether such directness is meritable or not, it is the dominating aspect, not only in the Iowa program, but also in a widespread movement for personality development.

Three other features, which accompany directness in this program, make clear the trend of the movement. In the first place, Iowa plans to build up each trait as a separate unit. The faculty has laid out a "list of traits to be worked upon, arranged, *in the order* in which they are to be developed," and a "list of readings to be made for each trait."[4] The student, therefore, begins with the notion of enhancing his personality by developing, one at a time, a few specific and separate traits.

Secondly, the whole program centers on success in the teaching vocation. The introductory problems presented to the Iowa students emphasize professional success:

"1. In what degree does the *success* and *failure* of a high-school teacher actually depend upon his *personality?*

2. How important a part does *personality* play in determining the *success* or *failure* in other occupations than teaching?"[5]

A third feature, which may be linked with the preceding, is the failure to define success in terms of any social ideal. In fact, Lancelot closes his article with a statement which actually submerges the social and philosophical interpretation of success, giving such discussion only a secondary position.

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[3] Lancelot, *op. cit.* p. 358.
[4] *Ibid,* p. 359.
[5] *Ibid,* p. 358.

"From the standpoint of sheer social value, we believe that training in personality is actually worth *more* to our young people *than* the study of any social science or combination of social sciences that can be named."[6]

After this brief consideration of the Iowa plan, we are now concerned, with pointing out the consequences that will probably come from any movement which centers on vocational success, that prefers "training in personality traits" to the consideration of social ideals as a way of finding the aim of life and education, and that relies chiefly on the simple and direct method of developing traits one at a time. While it is unlikely that any program will adhere exactly, in practice, to these features, still the characteristics mentioned are clearly evident in many of the schemes being inflicted on the students of our normal schools and teachers colleges.

If we begin by examining the effect of directness in approach, it may be seen that this method itself interferes with the character development desired by its advocates. Directness, according to Dewey, is an attitude essential for effective learning.[7] But Dewey's characterization of directness in the learner places this attitude in strong contrast to that produced in a student by such direct attacks on personality such as those that are now being promoted by Lancelot, Charters, and others. Dewey refers to "the straightforwardness with which one goes at what he has to do." The learner must not become self-conscious, because this attitude blocks his progress. "A self-conscious person is partly thinking about his problem and partly about what others think of his performances."[8] Effective learning cannot occur while one is in such a situation. Self-consciousness prevents the development of a "whole-souled" relationship between the learner and his task.

The Iowa program, examined from this angle, seems to produce an undesirable self-conscious attitude. Each student is made emphatically aware that he is trying to transform his own personality. Self-consciousness under these circumstances can scarcely be avoided. The more enthusiastic the students become about superior personality the higher self-consciousness will rise. More and more energy will be diverted from the task in hand to the side-issue of self-inspection. In other words, the

[6] *Ibid*, p. 361.
[7] Dewey, John. *Democracy and Education*, pp. 204-205.
[8] *Ibid*, p. 204.

direct method of teaching personality traits is a misleading device, because it renders directness of attitude in the learner impossible. Unless Dewey is wrong, our programs for the development of personality are in serious need of substantial modification.

It is clear that overemphasis on one's self must be avoided, in order to promote the desired changes in self. Furthermore, a student-teacher who is trying to develop *one* of his traits is in a peculiarly perilous position. He may be compared to the tight-rope walker who is learning a new trick. The balance in either case may be lost with disastrous results. The wise rope-walker pays close attention to his act and avoids dwelling upon what others may think of his performance. He knows that self-consciousness is fatal. He does not allow some professor to interrupt his act with shouted directions about his form. The rope-walker demands freedom to feel his own way undisturbed by considerations of himself as a performer.[9] A similar caution may well be observed in developing a trait of superior personality. If coöperation is the new adjustment to be acquired, it merits the undivided attention of the student. He cannot afford to think about the impression he is making as a coöperator, nor even look upon his activity as the practicing of a coöperation exercise. Unless such division of attention is avoided slips are bound to occur. Taking a truly coöperative attitude involves a certain loss of self-consciousness. As Dewey remarks: "Taking an attitude is by no means identical with being conscious of one's attitude."[10] The essential point is that neither a rope-walker nor a personality-builder can succeed until he completely forgets himself in his act. The first defect of a direct personality development method is that it gets in its own way. This kind of directness in approach blocks progress in the real enrichment of personality.

If the use of a direct method merely interfered negatively with the improvement of character, it might be safe to let each student-teacher discover this obstacle for himself. But a more serious danger appears when one considers the positively evil effects which arise from this method. A direct attack on one's own personality is likely to bring in its train, not only self-consciousness, but also selfishness and egotism.

Consider how a student-teacher's character will change, while he is pursuing a single trait, such as honesty, ambition, friendliness, a busi-

[9] Ogden, R. M. *Psychology and Education*, p. 239.
[10] Dewey, *op. cit.* p. 204.

ness like manner, or "refinement."[11] According to the Iowa plan each of these traits is to be acquired as a means to something else, namely, success. The teacher must show friendliness in order to become popular with his pupils, fellow teachers, and pupils' parents. Honesty must be developed because "honesty is the best policy" in teaching. The dominating aim is to get on in the teaching profession. Now the purpose which directs an activity enters as a determining factor into the characteristics and consequences of that activity. If refined, friendly, or honest acts are performed for the *purpose* of attaining personal *success*, selfishness is almost sure to increase with each act. And as success is attained, egotism may emerge. Thus, while the professor of education and his student-teacher are focusing on the development of this trait or that one, the whole character of the student may become more and more self-centered. A cloud of egotism and selfishness will cast a growing shadow over all the minor traits.

Such unfortunate results are likely to follow because the scheme of developing one trait at a time neglects the concomitant learnings—attitudes and ideals—which are inevitably acquired while that particular trait is being emphasized.[12] A superior personality produced in this one-sided way may resemble the output of cheap courses in salesmanship. No one wants successful teachers who conform to the pattern of "ambition-initiative-forcefulness-thriftiness-magnetism-business likeness" that sells the customer "what he does not want and makes him like it." But unless our personality development programs provide for careful and constant attention to the *whole* character change which is occurring in each individual, the chances are great that the combined influence of the emphasis on vocational success, the selfish inclinations of the student-teacher, and the present social environment will produce an undesirable shift of balance in favor of egotism. Thus, an aggressive program, which is animated by a sincere desire to improve our teaching force, may defeat its own end. Physiologists, psychologists, and educators are often misled by their ability to make a detailed change in one phase of the organism's activity, and they easily forget that each human being is an organized unity, and is, therefore, likely to change as a whole, whenever one of its members is modified. Since a personality changes as a whole, the out-

[11] Charters, *op. cit.* pp. 67-75.

[12] Kilpatrick, W. H. *Foundations of Method*, p. 103.

worn adage, "One thing at a time, and that done well," must be reinterpreted in the light of many simultaneous learnings.[13] Any scheme of character building which aims to develop only one trait at a time really paves the way for an inflated ego.

A third defect in the programs of Charters and Lancelot is that the fundamental ideals of life and education are not protected, although Professor Charters makes an especial attempt to do so. In considering the treatment of ideals in these plans, two contrasting phases of the direct approach should be distinguished. One phase is the emphasis on the performance of a specified list of activities that exemplify the application of a trait to a particular situation. Charters calls this list of activities "trait actions."[14] The other phase of the direct approach lays stress upon the students' acceptance of certain traits as ideals such as cleanmindedness, initiative, and so forth. The recent movement, affected by behaviorism, relies more heavily upon practice in trait actions. Lancelot, for example, says: "Of course, interest and *ideals* really represent *only first steps*. After this, it would remain to secure constant, unremitting *practice*, and this over a long period of time, else the necessary habits and skills, which *are* the personality traits, would not be fixed or developed."[15] Charters, in "The Teaching of Ideals," also has much to say in favor of practicing trait actions. Charters, however, does try to give ideals a large place throughout his discussion, in addition to the gesture in the book's title. Let us, then, defer the evaluation of "trait action practice," while we turn, first, to examine the plan suggested for developing ideals.

The chief danger in Charters' treatment of ideals is the tendency to develop one ideal at a time. While it may seem absurd to maintain that loyalty to such a worthy ideal as honesty, industry, or thrift could possibly injure the character of a student-teacher, I believe that a high ideal may warp a life *if* the ideal is given authority in its own right. Take, for example, the common notion held by many good people that one should do right, *regardless of consequences*. One must be honest though the heavens fall, or though one's best friend is alienated. The defeat of this theory, as pointed out by Otto, is that "in its anxiety to emphasize the need of *loyalty*" to an abstract ideal, "it leaves the *concrete object*

[13] *Ibid*, Chapters I, VIII.
[14] Charters, *op. cit.* p. 114.
[15] Lancelot, *op. cit.* p. 358.

of that loyalty to be determined by chance."[16] If the teacher stresses honesty *as such*, he is apt to neglect the social consequences of the act which he has covered with the label *honest*. Instead of relying on an abstract ideal he should remember that "life demands of us....intelligent choice between concrete, relative values or goods."[17] The teacher must be ready to re-define honesty, thrift, or industry, in the light of the effects of an act upon his pupils, his associates, and upon his own personality as a whole. The essence of character building is not the instilling of one isolated, abstract, ideal trait after another. It lies rather in the intelligent re-evaluation of each trait in such a way that all the traits of one's personality are given due consideration at the same time.

In the Iowa plan personality improvement itself tends to become an isolated and abstract ideal. The five steps mentioned lead toward a narrow and over-emphasized loyalty.

"1. Careful planning.....that *interest* may be aroused and held to the highest possible pitch throughout.

2. Discussion.....having for its end genuine *intellectual conviction* .....as to the actual worthwhileness of a good personality.

3. Discussion.....to arouse the *'emotional complex'* which gives urge, or drive, to what before was merely an idea, thus transmuting such idea into a true ideal.

4. The registering by the student of a definite *choice*, or *acceptance*, of the ideal.

5. An untiring, carefully-thought-out effort, on the part of the instructor, to *strengthen the ideal*."[18]

This emotionalized acceptance, followed by strengthening devices, is almost sure to make the student feel that he must attain a superior personality, *regardless of consequences*. He will then neglect tolerance, sympathy, fairness, and other ideals, in order to be loyal to the one which has been stressed. It is easy to believe that the end justifies the means, especially when accompanied by a certain blindness toward the effects that flow from the means employed. He may not even see that his activities are interfering with the personality development of his fellow teachers and of his pupils. Loyalty to any abstract ideal, in isolation from its concrete consequences, blocks the growth of ethical character.

What a student-teacher really needs to learn is how to make an in-

[16] Otto, M. C. *Things and Ideals*, p. 61.

[17] *Ibid*, p. 60.

[18] Charters, *op. cit.* p. 191.

telligent survey of the concrete social results of his specific acts, and how to use these observations in the reconstruction of his ideals. One must remember that in following ideals there is need for the same care as in employing the hypotheses of biological science. In both cases, the theory must be checked frequently with the transformations occurring in the whole organism or total personality. Ideals and hypotheses are indispensable agencies, but neither can be used as infallible guides, especially in an abstract form.

It might be assumed that since abstract ideals lead the soul into peril, the greatest safety would lie at the other extreme—training in concrete trait actions. But a little consideration convinces one that "Training in specific acts of honesty, truthfulness, etc., is not necessarily any more moral than training in the use of a typewriter."[19] If an act is performed as a part of a prescribed schedule, without the presence of any social purpose inherent in the act, it is not likely to produce any improvement in the student's ethical outlook. Character building involves the making of *choices* between a number of possible goods. If the learner does not choose or purpose for himself in regard to the specific act, the personality change is likely to be colored and perhaps dominated by the more general fear or desire which prompts him to play his part in the instructor's predetermined scheme. If fear of punishment dominates he becomes more subservient to superiors. If a desire for superior personality is the chief stimulus he becomes more self-centered. If loyalty to industry is the prime motive, there will be no ethical problem of directing his industry. The mere performance of a concrete trait action does not necessarily establish the trait for which it was designed, nor can we be sure that any favorable transformation in personality is occurring. An act of kindness may be done in a very unkindly spirit, and so aid in the production of a hypocrite. A concrete action in building ethical character is most helpful when it becomes a vital experiment in the great venture of thoughtfully creating a way of life by actually living it. Mere training in trait actions is a dangerous device.

Certain unfortunate tendencies in the personality development movement have been pointed out, but more positive suggestions should be made. These suggestions will be brief as they have already been implied in the adverse criticism. Furthermore, they are merely suggestions and not a program of character education for teachers in training. In attempt-

[19] Bode, B. H. *Conflicting Psychologies of Learning*, p. 273.

ing to indicate the basic principles for program building in this field, it is well to recognize that the development of a workable plan in any institution must be an experimental affair requiring considerable time for an accurate survey of the needs and possibilities. No ready-made plan can be offered, but we can consider the direction which this deliberation and experimentation may well take.

The need of an indirect approach has been suggested by the criticism of direct method. That is, the method should be less direct. But we do not mean to advocate the abandoning of conscious consideration of character training. The present social environment of our teacher-training institutions, as well as that of our elementary and secondary schools, needs modification for purposes of character development. Wider and richer opportunities for specific social actions should be provided. Coöperation can be learned only by coöperating. Teachers acquire effective personalities by solving concrete social problems. Analysis of the individual personalities comprising the student body may be a valuable aid in the planning and administration of such a program. Any effective plan must include some way of getting each student to engage in the kind of activities necessary for the eradication of his own personality defects, and for the creation of a strong, well-balanced character.

Moreover, the student-teachers must take the responsibility for training themselves in social action, as the faculty could hardly plan each student's program in detail. At times the student must attend specifically and consciously to becoming more cheerful or more forceful. If this attention to one's self is to be effective, the learner must occasionally consider the exact form of his cheerful action. "But," as Dewey says, "this need *is* occasional and temporary. When it is effectual a person thinks of himself in terms of what is to be done, as one means among others of the realization of an end."[20] The dominating purpose should be the doing of an act for its social results. Continued emphasis placed on the form of a cheerful action, the cheerfulness ideal, as such; or on superior personality as *the* end, is sure to bring undesirable results. Therefore, a constructive program of character building must provide the needed and purposeful social activities which will enable the student-teachers to engage in these activities with whole-souled directness. An indirect approach must be devised as a means to directness.

In this connection it may be noted that since worthy ends are essential in indirect character building situations, programs for personality de-

[20] Dewey, *op. cit.* p. 204.

velopment must provide specifically for the acquisition of new and worthy purposes by every student teacher. Now, new purposes grow, or are created, only in the midst of social action. One phase of a social experience is the evaluation of the consequences of that experience. If a person carefully evaluates the results of his action as he pursues his purpose, he will also be modifying his original aim. Through deliberate reflection on the social consequences he constructs a new purpose. His character is changed as he evaluates intelligently and reasonably. In Charters' words, "Teach a child honestly to reason out his moral problems, and his character will care for itself."[21] Worthy purposes arise out of intelligent experiencing.

But intelligent evaluation of experience can scarcely occur unless the student-teacher has some standard of ethical values, some kind of social ideal. In addition to making an accurate and broad survey of the consequences of any act, the person must be able to tell when he has attained desirable results. In other words, constructive, consistent character building cannot proceed unless one has a point of view or aim in life. This need for a unifying aim or social philosophy is easily forgotten in the midst of building personality development programs. As already noted, Lancelot declares that the study of social science is worth *less* than training in personality.[22] Charters, however, recognizes that reason must be given a chance to evolve unifying principles if an integrated personality is to be achieved as the result of character training.

"Finally, to develop a strong and consistent personality it is necessary to integrate traits, ideals, habits and customs in such a way that the person will act in the light of principles."[23]

"Integration is produced primarily by evolving principles of action through the use of reason."[24]

Charters' method of attaining integration, however, seems to be based on a misconception of the relationship between reason and training in specific traits. Like Lancelot, he opposes intelligent consideration of social ideals to training in habitual modes of action, and he fails, therefore, to give sufficient recognition to the possibility of intimate coöperation between habitual and intelligent forms of human activity.

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[21] Charters, *op. cit.* p. 347.
[22] Lancelot, *op. cit.* p. 361.
[23] Charters, *op. cit.* p. 13.
[24] *Ibid,* p. 347.

"The method of developing an integrated personality must be consistently and assiduously applied in school life as a *supplementary* influence to *counteract* the tendency toward dissociation arising from teaching the ideals by applying traits to specific situations. The development of character demands *equal* emphasis upon integration and specific learning."[25]

Instead of using intelligence to supplement and counteract habits, the most liberal functioning of intelligence can and should be encouraged in every stage and phase of character training. No habits should be formed except for a purpose.[26] Habits, so formed, *are* intelligent activities. No doubt Charters is right in assuming that dissociation may arise from "teaching ideals by applying traits to specific situations." But that is a fault of the *method* rather than an inherent defect of the human organism. Mechanical methods produce habits which are so dissociated from each other that even reason cannot integrate them. But if reason is given a fair chance from the beginning, integration will be, in a large measure, a continuous characteristic of the system of habits as it is developed. Intelligence or reason is not an overlord directing habits, nor are habits mere tools of the intellect. Personality is, at best, a unity which is constantly being achieved and reformed in such a way that the contribution of past experience (habitual activity) cannot be distinguished from the creative modification (intelligent activity) which must occur in the solution of the new problem in ethics presented by the new occasion of the present moment. The essential feature of character formation is the liberation of intelligence in the pursuit of specific ends.

When intelligence is given free play in the teaching of ideals no narrow loyalty to this ideal or that ideal is established, and so no supplementary influence of reason is necessary to counteract that tendency. Each ideal, as it is formed, becomes a member of the *whole* point of view, modifying the aim of life and being modified at the same time. So the student-teacher learns to "integrate his life and regulate it," *not* as Charters proposes, "under the domination of a *few* great principles of action,"[27] but rather in the light of *one* system or point of view which is organized in such a way as to include all the aims of life.

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[25] *Ibid*, p. 347.

[26] Bode, B. H. *Conflicting Psychologies of Learning*, pp. 269-272.

[27] Charters, *op. cit.*, p. 13.

The method of personality improvement adopted in teacher-training institutions should concentrate upon the construction and attainment of a central aim for education. In the direct pursuit and accomplishment of this task, the faculty and students may lose the kind of self-consciousness that interferes so seriously with their effective social action, and in so doing may step out into a kind of direct, whole-souled activity which will actually result in the attainment of superior personality without danger of feeling that superiority.

TRAINING COLLEGE FRESHMEN TO READ[1]

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THE study reported in this article is an outgrowth of previous work in reading carried on by the writer in a college remedial course given twice a year for the last seven years to probation students. It was observed that many of these probationers were very poor readers. In attempting to remedy their ineffective reading, the writer worked out certain methods of training which seemed particularly useful in raising the level of performance in this important element. A number of other investigators also found that the reading habits of college students are generally quite inadequate as a result of the type of training they received earlier in life. Many investigators have found that it is possible to remedy poor training in a relatively short time and with relatively little drill.[2] Practically every investigation which has been reported on this subject shows a decided increase in reading skill as a result of remedial training that was immediately directed toward the sources of difficulty. This article will deal with the results of an effort to train some 500 freshmen to "read."

I. NATURE OF THE EXPERIMENT

The students who scored the lowest in a reading test (given in connection with the University Intelligence Test) were selected for the experiment. Out of 572 students in this group 422 students, whose attendance was sufficiently regular, were given the remedial training.

The students came to one class a week for seven weeks. The classes varied in size from 15 to 60 students. During the first two lectures, material was presented upon the mechanics of reading with particular stress upon eye movements and vocalization. A third lecture was de-

[1] The study was assisted by a grant of test booklets by the Ohio College Association Committee, thus making available three standardized reading tests of 36 minutes duration for each student. This material was reported at much greater length in mimeographed form as the Ohio College Association Bulletin No. 55.

[2] Jones, E. S. *Testing and Training the Inferior Freshman,* University of Buffalo Studies, Vol. 5, No. 3, 1927; Odell, C. W. *Predicting the Scholastic Success of College Freshmen,* University of Illinois Bulletin, Vol. 25, No. 2, 1927; Remmers, H. H. *A Diagnostic and Remedial Study of Potentially and Actually Failing Students at Purdue University,* Bulletin of Purdue University, Vol. 28, No. 12, 1928; Pressey, L. C. and Truax, M. "The Value of Drill in the Mechanics of Reading," *Educational Research Bulletin,* VII, (Oct. 17, 1928), pp. 310-312; and Buswell, G. T. *Fundamental Reading Habits,* University of Chicago, 1922.

voted to showing students how to read paragraphs; the fourth lecture hour was used for a second test of reading. This test was given a second time because many of the students felt that they had improved sufficiently to be relieved of further drill. The fifth hour was used for drill in phrase reading. For this work a very simple type of tachistoscope was devised. The phrases to be read were thrown on a screen for a brief period—about a fifth of a second—and the students were then required to tell what the phrase was, or to answer questions on the phrases later on in the hour. The sixth period was spent in showing the students how to read graphs of various types, and the last period was again devoted to giving another form of the reading test in order to see what improvement had been made.

The drill material that was used outside of the class periods consisted of a manual of reading exercises developed by the author.[3] These exercises were so arranged that one could be taken each day in the week except Sunday, and were grouped into chapters, one chapter for each week. At the end of each chapter, there was a test by means of which the students might examine themselves as to their progress. The exercises provided drill in eye-movements, in increasing speed, in paragraph, section and chapter reading, and in graph reading. In addition to the manual of exercises the students were provided with eight mimeographed pages on a general discussion of the problem of reading. These pages presented the same topics as the exercises and lectures but also provided a little more background for understanding than might otherwise have been obtained. Some additional drill materials were used for some of the sections.

The experiment briefly consisted, then, as follows: The students in the lowest 25 percent in reading scores were required to attend a class once a week for seven weeks. They were provided with practice exercises and a brief "textbook" to give them a general background. During the class periods certain important matters of reading were discussed.[4]

II. RESULTS OF THE EXPERIMENT IN TERMS OF TEST SCORES

The first check test was given at the end of four weeks of drill, and on the basis of the scores 115 students were dismissed from further work.

[3] Pressey, L. C. *Reading Exercises for College Freshmen*, (Columbus, Ohio: Ohio State University Press, 1928), 112 pp.

[4] The writer is indebted to administrative officers and various members of the faculty for their coöperation and loyalty in carrying out this experiment; without them the work could not have been done.

since they had achieved a score at or above the 45th percentile of freshman ability in reading. The remaining students continued for another three weeks of work, and were then given another form of the reading test. The chart below shows the final scores of the entire 422 students. (Since the scores on the previous tests were "final" for 115 students who were excused, these were also included.) The results presented in the chart also show the first scores of the entire 422 students. It will be seen that 212 students—or half of the whole group—reached or exceeded the 45th percentile. At the beginning of the work, the median score of all the students was 14.0; at the end, the median score was 41.0. There was, then, an average increase of 27 percentiles.

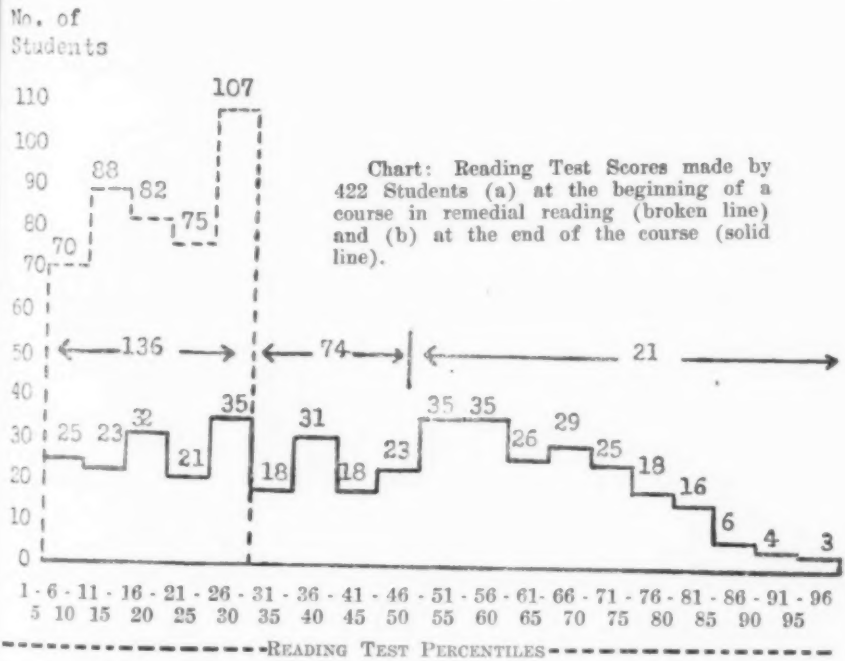

Chart: Reading Test Scores made by 422 Students (a) at the beginning of a course in remedial reading (broken line) and (b) at the end of the course (solid line).

Table I shows the relationship between the test results and intelligence. The higher the intelligence of these students, the larger the percent who reached a final standing of the 45th percentile or more. Especially noticeable is the very poor standing of those in the lowest quarter in intelligence.

TABLE I

SHOWING OF 422 STUDENTS SCORING IN THE LOWEST QUARTER IN READING, THE NUMBER SCORING IN EACH QUARTER OF THE TOTAL DISTRIBUTION OF FRESHMEN IN INTELLIGENCE, AND THE PERCENT OF THESE CASES IN EACH QUARTER IN INTELLIGENCE WHO MADE A FINAL READING SCORE AT OR ABOVE THE 45TH PERCENTILE

Quarter, in intelligence	I	II	III	IV
Number of cases	287	106	26	3
% above 45th Percentile	37	75	92	100

These results need some explanation and interpretation. The chan in score was to some extent undoubtedly due to increased familiari with the type of examination used. The amount of improvement, ho ever, found on retests is, for students of the general intellectual le found in the training classes, not over 10 percentiles. Subtracting th amount from the total gain, there still remain 17 percentiles of impro ment that must be due to something else other than familiarity with t examination. It seems probable that there was some actual gain reading skill. And it is probable, also, that there was a considera changed attitude as regards the importance of reading, with a cons quently greater effort to read skillfully. Presumably all three fact were of importance—increased familiarity with the examinations, grea skill in reading, and a changed attitude.

III. RESULTS IN TERMS OF ACADEMIC WORK

The increased ability on the tests is not, of course, a final indicati of any improvement of the students' reading habits. Unless the traini gained from the drill is transferred to the preparation of lessons, t project would be largely futile. It seemed of paramount interest, the fore, to follow this group through, at least, two quarters of academ work to see to what extent the reading drill seems to have influenced t marks received. The 422 students whose attendance was satisfacto were again selected for intensive study.

The 422 students of the experimental group were first paired wi students who entered the University two years ago. Each student w paired on the basis of intelligence, initial reading score, sex,[5] age, a college.[6] Thus, for Mary Jones who entered the College of Educati

[5] It was not always possible to pair every case as to sex; precautions w taken, however, so that the same number of students of each sex were selected fr each college.

[6] A more rigorous experiment would be to give reading remedial treatment every other freshman only, comparing scholarship at the end of the second quart This type of experiment is now in progress. In the present experiment, comparis had to be made with a previous year, since all the poor-reading freshmen of 19 were given help as above described.

in 1928 with an intelligence percentile of 26, a reading percentile of 17, and an age of 19, there was found another girl who entered the College of Education in 1926, who was of the same age and whose intelligence and reading percentiles did not differ from Mary Jones' by more than 4 percentiles. Each student of the group was paired with similar care.[7] The group from 1926 showed a median 17.7 in intelligence and 14.8 in reading as compared with 18.1 and 14.4 for the "experimental" group from 1928. The 25th and 75th percentiles of the two groups differ by the amounts of .6, .1, for intelligence and .9 and 0 for reading.

It should be clear that at the beginning of their University career the two groups were similar; one group was, however, given remedial treatment where the other was not. Differences of any size between the average point-hour-ratios of the two groups would thus be indicative of a significant difference due to some outside factor—not to chance variation.

The distribution of marks[8] over *two quarters* for the 422 students of the experimental group and of their partners from the control group were next tabulated (first two distributions in Table II). The figures show the average for all grades, whether the subjects taken involved much or little reading. This table shows that the average ratio for the control group was 1.41 while that for the experimental group was 1.67. This increase, though only .26, is of some significance since it is over five times the probable error of the difference—.045.

It should be remembered, however, that only 212 students in the experimental group showed any considerable progress on the tests given at the close of the training, thus, one would not expect any remarkable improvement from the entire group. A better indication of the results of the training might therefore be found by considering what gain there

[7] The pairing was done from cards which did not show the students' scholastic records; the pairing was, then, merely a matter of c'.ance so far as scholarship was concerned.

[8] The five marks assigned students—A, B, C, D, and E—are given points as follows: A counts 4 points, B, three; C, two; D, one; and E, zero. A student's mark in each subject is multiplied by the number of hours of credit that he receives for that subject; thus, if a student receives an A in a five-hour course, he gets 20 points on that course. The point-hour-ratio is simply the sum of all the points divided by the total number of hours that have been taken. A ratio of 1.7 is required for entrance into the senior year, and a ratio of 1.8 is required for graduation.

TABLE II

DISTRIBUTION OF QUARTER POINT-HOUR-RATIOS (A) FOR THE TOTAL EXPERIMENTAL GROUP (412 STUDENTS) AND THE CONTROL GROUP, AND (B) FOR THE 212 STUDENTS MAKING FINAL READING SCORES AT OR ABOVE THE 45TH PERCENTILE

Point-Hour-Ratio	Total Group		Special Group	
	Exper.	Cont.	Exper.	Cont.
4.0			1	
3.8 – 3.9		1		
3.6 – 3.7	3		2	
3.4 – 3.5			1	
3.2 – 3.3	7	3	5	
3.0 – 3.1	6	5	2	2
2.8 – 2.9	12	4	11	2
2.6 – 2.7	15	5	12	3
2.4 – 2.5	21	19	17	5
2.2 – 2.3	45	30	32	23
2.0 – 2.1	29	51	18	31
1.8 – 1.9	45	24	26	12
1.6 – 1.7	35	40	17	12
1.4 – 1.5	32	35	13	24
1.2 – 1.3	41	32	18	18
1.0 – 1.1	33	48	11	24
.8 – .9	42	20	10	10
.6 – .7	18	28	5	17
.4 – .5	12	22	8	9
.2 – .3	8	16	2	7
.0 – .1	7	37	1	13
Total	411	411	212	212
Median	1.67	1.41	1.96	1.46
Percent above 1.7	49	38	63	39

was on the part of the 212 students whose final score indicated a real increase in reading skill. The scores from these 212 students—and from their partners—were therefore tabulated separately (third and fourth distribution in Table II). The point-hour-ratio of the 212 students in the experimental group was 1.96. The ratio for their partners of the control group was 1.46. These students show, then, an increase in point-hour-ratio of .50 over their control group partners. This increase is outside of any probable chance variation; it is, in fact, 7 times the error of the difference (.068). This improvement is equal to a rise from about half-way between a "D" and a "C" to approximately a "C."

One further method of estimating the quality of work done by these students should be presented. For many years the University has been investigating the level of work done by students of different degrees of intelligence.[9] The writer wished to find out how the work done by the

[9] Edgerton, H. A. *Predicting Academic Mortality*, Columbus, Ohio: University Press, Ohio State University, 1928.

212 students who showed special gain on the tests compared with what would be expected of them without training. She therefore worked out a weighted average for the expected work of these 212 students. That is, she multiplied the expected average point-hour-ratio for students of each decile in intelligence by the number of the 212 who scored in that decile, and then divided the total by 212. The expected average ratio of the distribution of intelligence shown by the 212 students was 1.51. Yet those students actually made an average ratio of 1.97. The average intelligence score made by these 212 students was the 26th percentile. Yet, the work they did—as shown by a ratio of 1.97—is that expected of students whose average intelligence is at the 50th percentile. That is, these students did work such as is expected of students whose intelligence is 25 percentiles higher.

IV. DISCUSSION OF THE RESULTS REGARDING ACADEMIC SUCCESS

The interpretation of these results is, of course, somewhat difficult. There are several possible sources of error. (1) In the first place, since 1928 the University has made special efforts to deal more effectively with freshmen; (Freshman Week was introduced, a program of freshman counciling begun, and efforts made to improve instruction). It might, therefore, be that there had been a *general* rise in marks because of better teaching and more complete adjustment on the part of the students. The writer has compared the grades of all entering students in 1926 and 1928 and found no differences greater than .05 of a point for median or quartiles. The S. D.'s are identical. There has, then, been no general rise in the level of marks.

(2) It is possible the control group was not representative. To check this possibility, the writer selected a second control group from another year (1925) in exactly the same way as previously described for the 1926 group. This second control group showed a median in intelligence of only .4, and a median in reading of only .5 of a percentile away from that of the experimental group. The three groups used in these results are then very similar to each other in their composition. The academic grades of this second control group show a median point-hour-ratio of 1.45—as compared to 1.67 for the experimental group and 1.47 for the first control group. For the partners of the 212 cases who showed marked improvement on the reading tests, the median ratio was 1.51—as compared to 1.46 for the first control group and 1.96 for the experimental

group. The differences between the two control groups are in every case within the probable error. The experimental group as a whole showed a superiority over the first control groups of .27 and over the second of .23. The 212 selected students of the experimental classes showed a superiority over the first control group of .51 and over the second control group of .46. When compared with either control group, the students in the reading classes show unmistakable superiority,—about four times the probable error for the entire group, and of seven or eight times the probable error for the group of 212.[10]

(3) It might also be conceivable that the 212 students who increased most were the hard workers of the original group. Being industrious, they might also apply themselves to their academic work with equal determination, and the relationship between marks and improvement in reading may both be due to the type of student selected by the drill itself. This factor was too complicated for investigation with the materials at hand, but may have played a part in the results.

V. CONCLUSIONS

It seems quite evident from this investigation that it is possible to train students to read effectively and that such training is more likely than not to transfer to the preparation of lessons and to general understanding of college work. It must be remembered that the individuals being dealt with are adults and the subject one of elementary character. It is, therefore, reasonable to suppose that there would be a considerable increase in skill with relatively small amounts of labor. Similar results have been shown in other institutions. It is likely that the poor preparation which many students show at entrance may be much helped by intensive drill covering a few weeks. It would probably be advisable for training classes to be instituted, either in a university or in the high schools, for those students whose reading habits are inadequate. If the exercises were done under supervision, the results would be still better than those reported. Such an arrangement is now in force at Ohio State University, the results of which will be reported later.

[10] Under a relative grading system, with practically all the poor reading low-intelligence group involved in the experimental group, it would seem that improvement in marks can only be made (in the main) by competition with the more intelligent initially-better-reading freshmen (and upperclassmen) who must be forced to obtain a higher proportion of the lower grades than in the former years when the remedial reading was not undertaken. If this surmise is true, then the real improvement in scholarship exceeds the found, or apparent, improvement.

VI. SUMMARY

(1) This article presents results of an experiment in teaching college students to read.

(2) Four hundred twenty-two students scoring the lowest fourth of a reading test given to all freshmen were selected for training, which lasted for seven weeks.

(3) The academic work for two quarters of those trained is shown to be definitely superior to the academic work done by similar groups of students of the same initial intelligence and reading skill.

(4) Three possible sources of error are discussed, two of which do not effect the results.

(5) It is concluded that training college students to read is entirely feasible and results in real gains in academic work.

THE SCIENTIFIC METHOD IN THE STUDY OF EDUCATION

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THE term "scientific research," as applied to education, is at present rather vaguely used. It is applied to a great variety of activities and results, to some of which it clearly does not belong. The methods employed in some cases are not always truly scientific and the results obtained are therefore not wholly reliable.

In planning a program for the professional education of those who are to carry on research activities in our public school systems, one of the first things to be considered is that of bringing about, somehow, a change in the present conditions so that research and the results may be more effectively applied in the improvement of education. What is needed in charge of research activities in public school systems are men who possess, in addition to adequate training in the tools, techniques, and methods of research, the necessary qualities of leadership and a professional education and experience that will enable them to see in proper perspective the needs and possibilities of a modern school system. Such men are not likely to be available, however, until through the administrative reorganization of this work the position of director of research is made more clearly defined as in matters of salary; and professional opportunity will attract men and women of the requisite ability, training, and scholarship.

This necessary administrative reorganization is possible. The difficulty of bringing it about, though real, is by no means insuperable. Essential principles to be followed and the conditions to be met in bringing about such a reorganization may be briefly stated as follows:

(1) Research service should be maintained for every school system, regardless of its size. Scientific study is necessary everywhere in present-day education. Mere personal opinion, however expert and experienced, is no longer sufficient. It is impossible to maintain an efficient modern school system without the aid of research and no American public school, urban or rural, should be without service of this kind.

(2) Any city school system that elects to maintain its own bureau of research should establish a bureau only on condition that it is willing and able to support it to a certain minimum standard of efficiency; and no bureau of research should be recognized as standard, whose ser-

vices are not distinctly felt and valued as a real and positive factor in improving the schools.

(3) No person should be permitted to serve as director of the bureau of research of a city school system, who cannot by virtue of his personality, leadership, professional education and experience, and his technical training in the tools and methods of research, hold the confidence and respect of his associates.

(4) To secure the services of such a director in any community, a salary of at least four or five thousand dollars per year is necessary. In most instances it is not likely that a suitable person can be secured for as little as $4,000. This being true, it is obviously unwise for any city school system to decide to establish and maintain its own bureau of research if it cannot pay the director a salary of at least $4,000 and furnish a sufficient additional sum for the salaries of assistants and for necessary operating expenses to enable the bureau to measure up to the above standard of recognized value to the schools.

(5) Investigation shows that nearly one-half of the cities now operating their own bureaus of research are paying their directors less than $4,000 and the amounts appropriated for salaries of assistants and for operating expenses are also quite inadequate. This, I should say, is true of the great majority of the cities of less than 75,000 population. Either these cities should increase their appropriations sufficiently to meet the minimum standard for efficient service, or else abandon the effort to maintain their own bureaus altogether.

(6) To meet the needs of such cities and of smaller communities, every state should maintain standard bureaus of research in the state department of education, in the college of education at the state university, and in some or all of its state normal schools and teachers colleges. These should also be supplemented by similar bureaus established in privately endowed colleges and universities that are devoting attention to the professional education of those who are to serve in State and city school systems.

(7) City, town, county, and district school systems which cannot afford to maintain standard bureaus of their own should arrange to utilize on a part-time basis the services of these bureaus of research which are maintained by the state or by private institutions. This arrangement would be of mutual advantage, both to the schools and systems that are served in this way, and to the institutions which furnish the service. It would assist in keeping these institutions in vital and stimulating touch

with actual school conditions, problems and needs over the state, and with important practical problems of administration, supervision, and teaching, which they can and should assist in solving. In some respects the services to a local school system, rendered by a bureau outside of the system, may be of more value and better appreciated than similar services rendered by an equally efficient bureau maintained by the system itself. This is especially apt to be true in settling, by means of research, certain controversial questions on which the professional forces of the school system are divided. In such cases the decisions of the outside bureau are likely to be received with more considerations and with greater freedom from bias of personal opinion due to local influences.

(8) Cities of 75,000 population and above, and even smaller cities that can afford it, should maintain standard research organizations of their own. In such a city, according to its size and wealth, anywhere from $12,000 to $100,000 or more could be profitably spent each year on problems of research whose solutions would add materially to the efficiency of the schools.

In any state where these conditions are fully met, in which no research bureau is maintained by the state or by local support which falls below the minimum standard that should be maintained, it would be possible in a short time to place in charge of all bureaus of educational research persons of the ability and training necessary for efficient service, for under these conditions it would be possible; first, to define the position of director, analyze the work to be done, and decide upon the qualifications necessary to success that can be provided through professional education and experience; secondly, to determine the official relations to superintendents and others in which directors of research should be placed in order that their services may be most effective; thirdly, to set up highly desirable coöperative relations among the several research bureaus within a given state that would coördinate their effort and greatly increase the extent and value of their combined services to all schools within the state.

If educational research were administratively reorganized in accordance with the foregoing plan, a suitable program for the professional education of research directors could be intelligently set up, for then the problem would be greatly simplified and the qualifications and relations essential to successful service would be much more clearly apparent.

Among these qualifications and relations the following may be taken as typical. First of all, the director of research in a city school system should have the rank of an associate or assistant superintendent. He

should be in charge of research and be officially subordinate to no one except the superintendent and the board of education. He should be directly responsible to the superintendent to whom his services should be at all times immediately available for any investigation that may be needed in determining the policy, program, organization, administration, or supervision of the schools. In a wide awake and progressive school system most of the time and energy of the director of research would inevitably be spent on problems which require practical as distinguished from so-called pure research because these are the problems which arise directly out of the needs of efficient administration and consequently call for speedy solution. Nor will these problems be merely concerned with the executive aspect of administration. It is, of course, true that one of the fundamental functions of the superintendent of schools in which he will constantly need the help of a capable research man is that of being chief executive of the board of education, responsible to the board and the people for the efficient management of the schools. In the discharge of this function the problems met with whose solution requires scientific research are those which are concerned with securing increased efficiency in what the schools are attempting to do. They are problems which call chiefly for the use of tests and measurements and for the experimental study of various methods of learning, teaching, supervision, and administration in the effort to arrive at the most direct, and economical ways and means of attaining the recognized objectives of the schools. The one thing sought for in the discharge of this executive function of school administration is efficiency. Assuming that it has somehow been decided wisely or unwisely what the schools are to teach and why, the question here is how shall they realize to the people in the education of their children a maximum return for every dollar spent on the schools.

As one studies the work that is now being done by bureaus of research in city school systems he is led to believe that more than three-fourths of the time and energy of these agencies is now being spent on tests of efficiency of one sort or another. The words tests and measurements are those that are by far most frequently met with. So prominent has the test and measurement movement become, that there is a marked tendency in some instances to consider it as the only thing worthwhile in educational research and to regard any young person who has had a good course or two in tests and measurements and perhaps an elementary course in statistics, as properly qualified for the directorship of research.

I do not mean to imply in what I have said that this work is not important. It is important if carried on in a reasonable and intelligent way and if the results are properly applied in the improvement of educational practice. What I mean to say, however, is that testing and measuring is by no means to be regarded as the only work which a director of research is supposed to do, nor is it the most important service which a properly qualified director should render.

One may freely admit that the superintendent's function as a chief executive of the board of education is a very important one. At the same time we are compelled to assert that under present conditions in American education it is not his only important function. He is officially the chief adviser and counsellor of the board of education and the people in all matters of education. Modern education is not simply an affair of the schools. It is a responsibility for the whole community. It is not confined to any one period of life or any one agency or group of agencies. What is the place and proper function of education in our changing civilization? What is its relation to the other fundamental interests of modern life? What should the public schools really attempt to do? What should be their relation to the other educative agencies in their environment? To what extent and in what ways should the public school coöperate with these agencies? If any one of the fundamental institutions of society neglects the functions and types of educational service, which naturally belong to it, to what extent should the school take over these neglected functions in addition to those which are recognized as its own? What, in short, is the school's own proper work and by what criteria shall its right and obligation to do the things which it is now attempting to do be rightly judged?

These are questions which satisfactory leadership in modern education cannot dodge. It is indeed just as important that the city school superintendent shall be able to say in a manner that is wise and convincing what the schools should teach and why, as that he should be able to prove by means of scientifically determined standards and measurements that the schools are doing efficiently whatever they may have undertaken to do. To answer these questions satisfactorily the superintendent needs the help of scientific research of a very different sort from anything that can be supplied by efficiency tests alone. He needs the help of scientific studies that will throw light upon the adaptation of the work of the schools to community life needs and conditions as well as to the individual capacities and needs of children. Much valuable

work is now being done in the scientific study of difficult school conditions and of their effects upon the life and education of children, both in departments of educational sociology in schools of education and by various social organizations outside of schools and universities.

It should therefore be an important part of the work of directors of research to be able to know, evaluate, and use the technique for the study of social problems that are being developed, and to show how results of this form of research may be effectively applied in the determination of educational policies in setting up suitable programs for the progressive realization of these policies, and in deciding upon the best organization of all the forces of education for carrying these programs into effect. In these ways and in others an able director of research can render invaluable assistance to the superintendent of schools in recommending changes in policy to the board of education and supplying that body with all the information it should have to decide whether or not the people shall be committed to the changes proposed.

If the director of research is to hold this title of assistant superintendent and render to the superintendent and the board of education these types of service, he will need to be thoroughly grounded by training and experience in the fundamentals of school administration. Without such training he would be unable to evaluate the forces that are at work within a typical school system and to see the system as a whole, its needs and working conditions, in a proper perspective. He would be unable to analyze the situation at any given time and decide upon the problems of crucial importance and upon the order and manner in which these problems should be studied. Moreover, without actual experience in administration in the management of the human factors involved, the director of research is likely to fail in organizing and using the forces of the system for the scientific study of problems and in securing their willing and interested coöperation. The director's success will depend in no small measure upon the geniality, good fellowship, and confidence in his leadership that he is able to inspire among those whom he must train in the necessary methods and techniques for the work that must be done. He may be wonderfully well grounded in the techniques and tools of research, but if he is unable to secure the interested coöperation and good will of his associates in the school system, he will certainly fail.

For similar reasons the director of research should have had systematic training and experience in school supervision in some form or other. It is desirable that he should have had experience in teaching. Without

this training and experience he is likely to overlook some important factors that should be taken into account in interpreting the results of achievement tests and recommending procedures for improvement based thereon. His failure to take proper account of such factors will inevitably cause the more intelligent teachers and supervisors of the system, who recognize the presence and influence of these factors, to lose confidence in his results and in his reliability as a scientific student of education. For example, in two adjacent schools in the same system in which, at first glance, the conditions seem essentially the same, results of achievement testing may be quite different on account of causes other than relative efficiency of teaching and supervision. There may be differences in the conditions under which the work is done; the general intelligence of the children; their previous school history; their general health; sufficiency of food; sleep and exercise; social and family conditions such as broken homes and the influences of home and family life; regularity of attendance and the relative exposure of the children to the work of the schools; actual length of the school year which is known to vary by an average of a whole month even in adjacent schools in the same city; the relative ability of the children to use the English language effectively; the attitude of the community toward the value of education in general and of the schools in particular; and various other conditions over which teachers and principals have little or no control. If such factors as these are overlooked and the differences shown in the achievement of the pupils are ascribed exclusively to the quality of the instruction the study may prove to be a detriment rather than a help in its influence upon the work of the schools.

Patience, poise and abundant common sense are also very desirable qualities of a director of research, willingness to proceed slowly, if necessary, in carrying out a research program, to begin on a small scale, selecting few rather than many problems and introducing new procedures into a few schools at the start instead of into all the schools at once. As the confidence in the director and the bureau grows, things may be safely undertaken on a larger scale. Too many young and ambitious directors want to accomplish everything at the start, apparently believing that the first step in improving an organization is to wreck it. This, of course, is fatal. The conditions in the school system may sometimes be such as to make it unwise to replace at once a poor procedure by a better one, even though an investigation that has been completed shows conclusively that the change should be made.

Finally, in the actual work of research as it should be carried on in education, at least four things are necessary in the professional education and personal equipment of the director.

(a) It is essential that he shall be a thorough master of the fundamental tools of research. He must know these tools thoroughly and be able to use them effectively. The experimental, historical, comparative, statistical, logical, psychological, sociological, philosophical, and other established methods of getting at the truth in the study of educational problems should be at his command.

(b) Secondly, the director of research should have a broad rather than a narrow and restricted conception of the possibilities and limitations of the scientific study of education. He should regard science as refined, rationalized, extended common sense applied in any field of experience for the satisfaction of some human need. He should also regard the method of science as any valid way of enlarging the stock of tested information, any effective method of extending and testing experiences and of converting information into verified knowledge. In education as everywhere else, progress depends primarily upon extending and validating pertinent facts of experience as fully and accurately as possible. But it must also be recognized that simply ascertaining the facts in any direction does not in itself constitute science. The facts must form knowledge and must, therefore, be related in ways that can be depended upon at any time in the effort to serve some human purpose. This purpose is not always the same. In education as elsewhere it may be any one of a number of things all of which are legitimate and useful at one time or another.

(c) In the third place, the attitude of the director should be truly and consistently scientific, honest, sincere, impersonal, interested only in the discovery and accurate reporting of the truth, and willing to suspend judgment and to revise any previously accepted point of view when the results of investigation seem clearly to justify doing so.

(d) Lastly, it is important that the research director, in reporting his results, should present them in simplified form, from which technical terminology and procedures involved in the study have been entirely eliminated so that his findings may be readily comprehended by those persons, teachers and others in the school system, who are untrained in such technical matters but must nevertheless be depended upon to use the results in ways that may be desirable for improving the schools.

In conclusion, in view of the foregoing analysis, a satisfactory program for the professional education of the research director for a city school system may be briefly stated as follows: (1) a general education represented by at least a strong college course and a baccalaureate degree; (2) approximately three years of graduate study and research in education terminating in the attainment of the doctor's degree and including (a) fundamental courses in educational psychology, educational sociology, history of modern education, principles of teaching, philosophy of education, educational administration and the supervision of instruction; (b) thorough training in the details of research applicable to the scientific study of education and extensive practice in using these tools in the study of problems of teaching, supervision and administration; (c) familiarity with the methods and results of the more important school surveys and of the outstanding pieces of research now available in literature of elementary and secondary education; (d) study of the agencies of research in city school systems, their functions and organizations and methods, and of the best ways and means of setting up worthwhile programs of research and carrying them into effect; (e) practical experience in a standard bureau of research involving responsible participation in the various important types of work on which such a bureau is engaged; and finally (f) an acceptable doctor's thesis dealing with some important up-to-date problem in the study of education.

EDITORIALS

NEEDED RESEARCH IN CURRICULUM BUILDING

In building a curriculum we are concerned with content, placement, and the organization of subject matter for teaching purposes.

The content of the curriculum has usually been considered from the standpoint of the demands of society, recently from the standpoint of the child's interest, and occasionally from the standpoint of the ultimate complete development of the individual. All three standpoints are legitimate; no single one is complete without the others.

The study of the demands of society has ceased to occupy the center of the stage. This is unfortunate, as it has not finished playing its task. It must soon come forward again to finish this task and to supplement the child's-interest and individual-development philosophies.

The demands of society come under two main categories: the knowledges and skills which each person must possess in order to function effectively; and the social attitudes and ideals necessary for society's progressive continuance.

The knowledges and skills which people need to master, again subdivide into two groups—those which are needed by practically all intelligent persons, which we may call the common essentials, and those which are needed by some particular vocational or avocational group.

The common essentials need to be determined much more completely than has so far been done. They need to be specified with much more precision. Then techniques must be developed which will enable children of varying capacities to master them.

The knowledge and skills needed only by certain groups should never be required of all children. Specialized courses in junior and senior high school and on the college level should be provided for special groups. Such courses should be based on the same sort of careful research of group needs, specified with the same precision and taught with the same provision for individual mastery, as in the case of the common essentials.

Little research work has been done on social attitudes and ideals. We talk fluently but our ideas are hazy. When we attempt to analyze and define we encounter difficulties unsuspected. This, perhaps, is the

greatest need in education today and we are probably farthest from the goal.

Children's interests are being considered by some teachers as a means to the end of either individual or social development. Others make them an end in themselves, feeling that children have a right to happy lives for the present, regardless of any preparation for the future. Still others maintain that full living today is the best preparation for tomorrow. This leads to a concentration on the children's present interests, and a trusting that this will result in ultimate development and socialization of the individual.

The development of the individual as an end in education is very prominent in the progressive education movement. It is conceded as desirable by everyone, but no one knows, as yet, how to achieve it most effectively and how to determine to what degree it is achieved. Science has scarcely entered this field, except in a negative way. Child guidance clinics have found that certain individuals are failing to develop satisfactorily, and apparent causes of this failure have been indicated.

From all three standpoints—that of effective mastery of socially needed knowledge, skills, and attitudes; that of the child's happiness; and that of the best development of the individual—it is necessary that his readiness for any specified type of training or activity be determined. This idea is so new that it has no adequate name, but the nearest approach to a name is "grade placement." If by "grade placement" one means the allocating to the fifth grade, for example, of addition of fractions, the term is far too narrow in its meaning to serve us. More broadly it is the determination of the stage of a child's development at which he can most effectively engage in any specified activity.

A few crude beginnings have been made in this direction. The difficulty children have with spelling-words at different grade levels; the interest of children in books at various age and reading-ability levels; the capability of children to learn and retain certain arithmetic topics at different mental age levels—have all been at least partly explored. Close recorded observation of children, especially under the age of seven, has revealed something of the activities in which children participate without compulsion. A study of the toy interests of children between the ages of six and fifteen has cast sidelights on this general subject. The field of grade placement is exceedingly promising, but as yet little work has been done on it.

In organizing the content of the curriculum it is necessary first to separate, for careful analysis, the three general functions. Then they must be reintegrated. Knowledge and skill cannot be just poured into a child. His interest and developmental age must be considered if there is to be any hope of his assimilating the material presented. The child's happiness is as necessary to mental digestion as it is to physical digestion. Waiting for an appetite to develop and serving things appetizingly are essentials of effective curriculum making.

Method in curriculum making is undergoing marked changes, but will have to undergo still more. Provision for individual differences in the mastery of knowledges and skills; means of socializing children; the full use of the children's natural interests; learning through development rather than through acquisition; the discovery and cultivation of children's specialized interests and abilities; the integrating of their social and individual life—these are the problems demanding research rather than an exclusive concentration on the relative effectiveness of borrowing or equal additions in subtraction, and such like separate learning elements.

Extensive research along these lines is greatly needed and integration of the findings of research must be made before we are ready to apply the results to the child. Leaders in education should be able to see the curriculum as a whole and its relation to the child both as an individual and as an integral part of society. In curriculum building we are beginning to realize the need of integrating all the separate bits of research. But above all we are seeing the need of more extensive research on a much more comprehensive basis than ever before.

CARLETON WASHBURNE

REVIEWS

Address all communications relative to book reviews to Editor E. J. Ashbaugh, Miami University, Oxford, Ohio.

GRAY, MASON D. *The Teaching of Latin.* New York: D. Appleton and Company, 1929. xvii. + 235 pp.

This book is one of the Appleton Series in Special Methods, edited by Paul Klapper, Dean of the School of Education in the College of the City of New York. The Preface, by the widow of the author, indicates that its subject matter was practically ready for publication at the time of Dr. Gray's death in October, 1928. The Editor's Introduction would be passed over without comment by the reviewer did not its first three paragraphs, which attack "teachers of Latin as a class," seem to him to consist mostly of false promises and misleading and inaccurate statements, and to be pedagogically inappropriate. It may be that the reviewer, who for twenty years has had a somewhat extensive acquaintance with prospective and actual teachers of Latin and their practices and claims, has been exceptionally fortunate in this acquaintance, and therefore his conclusions concerning teachers of Latin as a class, differing much from those of the editor, are based upon data not scientifically evaluated. Doctor Gray, however, whom the editor regarded as "an informed scholar, with an intimate knowledge of current theories and practices in the teaching of Latin," shows nowhere in the book that he would have agreed with the editor's extreme statements, but rather, if carefully read, contradicts or refutes most of them. But even if the editor is right and teachers of Latin as a class are intellectually immature, dishonest, or the bad backward boys of the Schools of Education, as it were, isn't it rather poor pedagogy to brand them as such and spank them publicly just before the lesson hoping thus to motivate them to reform and to learn? Doctor Gray's book does not deserve that handicap.

The contents are given in a detailed and serviceable form. The eleven chapters which follow discuss the Status, Place and Purpose, Motivation, and Objectives of Latin in Secondary Schools. Objectives are divided into immediate, and ultimate or educational. Under the first are listed comprehension and translation, vocabulary, inflections, and syntax; under the second, instrumental and application, disciplinary or general training, and historical-cultural. The Appendix contains various kinds of material of practical value to teachers, such as bibliographies, English-Latin and Latin-French word studies, sample tests, etc.

Those who are familiar with Professor Game's *Teaching High-School Latin*[1] will not find in this later book as much that is new or revolutionary as the statements of the publishers and editor of the series would lead them to expect. Though the two books, however, treat many

[1] Game, J. B. *Teaching High-School Latin. Revised Edition.* University of Chicago Press, 1925.

the same topics, Doctor Gray generally goes much more into detail and often has a different point of view, and each book may well be a supplement and occasionally a corrective to the other.

Those who are familiar with the Report of the Classical Investigation,[3] an Investigation in which Doctor Gray took a very important part, will recognize in his book a defense, an elaboration, and a scholarly and practical application of the Report. Those who agreed with the Report will be enthusiastic readers of the book, and those who disagreed with some of the conclusions of the Report, will probably continue to disagree. There is so much in the book, however, that all teachers of Latin can accept *in toto*, if they have not already done so, that there is no point in picking out a few debatable parts to comment on here. Most experienced teachers, both in colleges and secondary schools, may profitably study Doctor Gray's book; to the inexperienced teacher it can be a veritable thesaurus of helpful suggestions and stimulating ideas. One danger, perhaps, is that the young inexperienced teacher who is wanting to be told exactly how to teach may lose interest in the book before he has finished chapters one and two, which are historical and abstract in character. Another danger is that the book may lead him to believe that method may be substituted for increasing knowledge and love of what he is teaching. The necessity for the teacher of broad and sympathetic scholarship is indicated several times but perhaps not adequately emphasized.

The reviewer's conclusion is that, if most teachers of Latin both young and old (to say nothing of supervisors and teachers of high-school methodology) will study carefully *The Teaching of Latin*, they will be richly repaid; the teaching of Latin will be greatly improved, and Doctor Gray's "interest and self-forgetful devotion to his chosen work" will bear the fruit that he hoped it would.

Miami University F. L. HADSEL

KNIGHT, EDGAR W. ***Education in the United States.*** Boston: Ginn and Company, 1929. xii. + 588 pp.

A recent analysis of courses in professional education by a superintendent of schools refers to the "mild contempt" with which administrators view history of education. Among the ubiquitous graphs, survey blanks, comptometers and cages of white rats in a "practical" and "scientific" college of education, the appearance of a subject bearing the stigma of "culture" does seem a bit anachronistic. But Professor Knight attempts to lift the history of American education out of the poor relation class; he makes it "practical." "Educational magic and wizardry," he boldly charges, "are found to be insufficient. Statistical data, . . . though immensely valuable, are often impotent in the face of certain chronic educational diseases. Before the remedies can be found the inevitable question arises: How did these conditions develop?"

The work is vitalized by the simple yet effective method of reversing history. The first chapter briefly sketches educational conditions as they are; the remainder of the book relates "how they got that way." Refusing to bow to the hoary idol of chronological order, Professor Knight takes up, topic by topic, the development of interest in secular education, of public support and public control of schools, of teacher training and of secondary and higher education. Nor does he suddenly break off his narrative

[3] *The Classical Investigation* (Part I): General Report. Princeton University Press, 1924.

with the year of our Lord 1929; rather, he attempts to project the evolutionary movements into the future, to apply the laws of educational heredity to the breeding of better strains of educational practices. In this latter effort he unashamedly reveals himself as an indoctrinator. His breaking of the time-encrusted shackles of "knowledge for its own sake" should win applause from some of his more timorous colleagues who still render lip-service to tradition.

True, there are some serious defects. In gleefully pricking the bubbles of historical mythology the author was occasionally blinded by the resulting explosions. Evidence is distorted or suppressed in his denial of the educational leadership of colonial New England. To state, as he does, that the Massachusetts Law of 1642 and the Virginia Law of 1643 were similar is pure nonsense. The chapter devoted to Southern education is a contribution, but the claim of Southern equality in the early struggles for free public schools is not. Possibly, however, each of us should be allowed one prejudice.

Another defect is the over-emphasis upon the history of the external features of the schools and inattention to the development of curricula, educational aims and methods of teaching. This is particularly flagrant in the case of secondary education. Lack of research in the latter field may extenuate the omission. The author's engrossment with administrative matters may be justified; for after all, who stands in more desperate need of history of education than administrators?

Ohio State University PAUL J. FAY

PAYNTER, RICHARD H., and BLANCHARD, PHYLLIS. *A Study of Educational Achievement of Problem Children.* New York: The Commonwealth Fund, Division of Publications, 1929. x. + 72 pp.

This study is a report of the educational achievement of 167 problem children in Los Angeles, and 163 similar cases in Philadelphia examined in the demonstration child guidance clinics of the National Committee for Mental Hygiene of which the authors were staff members. It deals with the selection of children, methods of study, presentation of data, discussion of methods, a resumé of other investigations, and conclusions.

Although the analysis and treatment of behavior and personality difficulties were the chief functions of the guidance clinics, the educational data were also available as a part of the intensive study of these children. All cases were tested quite thoroughly with a battery of educational and mental tests including the Stanford-Binet and Stanford Achievement Tests. Intelligence quotients, educational quotients and accomplishment ratios were computed, and grade placement was studied with respect to life age, mental age, and educational age.

The authors were pleasantly surprised to find that the educational achievement of problem children was not significantly below that of normal children, but the basis of their deductions are somewhat open to question. They eliminated from their behavior groups all cases with IQ's below 80, and in the normal distribution of children at least five percent would be excluded. A conservative estimate would exclude at least ten percent of all behavior cases with an IQ of 80 as the upper limit. The Philadelphia cases were not compared with any other group, but the Los Angeles cases were compared with 4,325 other Los Angeles pupils in accomplishment ratios only. In the large control group cases were included with IQ's above 70. The accomplishment

ratios of 64.7 percent of the problem cases and of 66.2 percent of the control cases fell below 100. Data must have been available for comparisons of the two groups in achievement not only in accomplishment ratios, but also in grade placement with respect to life age, educational age, and probably to mental age. In the Los Angeles cases there was an average IQ of 107.6 for the ten highest in achievement ratios, and 101.4 for the ten lowest cases.

Data were compiled on the frequency of behavior and personality traits with respect to IQ, EQ, and AR and also as to grade placement with respect to life age, mental age, and educational age. In all of these categories meager differences were found in educational achievement. "The only exceptions to this statement would be in the case of feelings of inferiority and inadequacy, which did appear in conjunction with low ratings on intelligence and educational tests, and of certain behavior difficulties which were associated with grading below life age. But this is true only for the Los Angeles cases. Among the Philadelphia children day dreaming was the only personality difficulty which was associated with low ratings." (p. 41.)

The authors emphasize that such extrovert traits as truancy, stealing, and disobedience tend to affect immediate school achievement, whereas the introvert tendencies of fear, seclusiveness, and day-dreaming show little immediate effect, but are actually very important since they lead to inadequate vocational adjustment with the termination of formal schooling.

Throughout the discussion the authors constantly remind the reader to accept their results tentatively, and they continually recognize the possible inadequacy of their data. Their efforts in the presentation of very complicated and difficult data are to be commended. Copious and useful references throughout the text, possibly excuse the absence of the usual index.

HARRY J. BAKER
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COCKS, A. W. *The Pedagogical Value of the True-False Examination.* Baltimore: Warwick and York, Inc., 1929. x. + 131 pp.

After two brief introductory chapters summarizing a number of studies of the limitations of the traditional examination and advantages of new-type tests, the author devotes the bulk of his space (90 pages) to a description and analysis of several of his own recent investigations. The issues studied are principally: the pedagogical values of true-false and multiple-choice tests, the proper method of scoring of such tests, the relative instructional value of true and false items, and the gains from self-correction of test papers. The last mentioned angle of Cock's work is the most important and the most novel in the opinion of the reviewer, although the underlying psychology is familiar to all.

The chief experimental method may be described in a few words. Two experimental groups ($N = 38$ each) were equated through mental test scores. Each group contained first, second, and third year high-school pupils in approximately equal numbers. An initial test of 50 multiple-response and 50 true-false items was administered to both groups. One group corrected its own papers (the experimenter explaining the answers briefly); the papers of the second group were collected at once and scored by the experimenter. One week later a test composed of recall items similar to the original questions was given. In another

experiment the interval was four weeks. Gains from the first to the second experiment were computed and compared. The principal conclusions are:

1. All tests have more or less pedagogical value.

2. Self-correction increases this value.

3. The correction should be done as soon as possible after testing.

4. The true-false test appeared to have more instructional value than the multiple-response.

5. False items are not objectionable, i.e., they do not implant false information. (They are not, however, superior to true items as Ballard has claimed.)

6. The benefits of self-correction are not transitory; they are maintained over a period of several weeks at least.

7. Bright pupils gain more from multiple-choice than do dull pupils, but the true-false shows no such difference.

8. Instructions against guessing are recommended, and, in general, the $R—W/(n-1)$ formula is best for scoring.

The author has chosen widely and well in citing experimental evidence related to his topics. Save in one or two respects he has been unusually fair in his criticism of others. The main weakness of this study is the extremely small number of cases upon which his conclusions are based and the failure to state probable errors in interpreting differences. Against this criticism may be set the fact that Cocks' results do "square" rather well with the more extensive investigations in print. Certainly he has contributed an important point when he emphasizes the value of self-correction of papers. One or two recent and related studies might have been cited to advantage.

The reviewer noted with pleasure an improvement in the publisher's mechanical make-up of this volume in comparison with certain earlier products.

University of California G. M. RUCH

THOMAS, DOROTHY SWAINE. ***Some Techniques for Studying Social Behavior.*** New York: Teachers College, Columbia University, 1929. x. + 203 pp.

This little volume consists of a series of studies by Doctor Thomas and eleven associates in the Child Development Institute of Columbia University on methods of recording and measuring the social behavior of young children. The aim is to decide "what are the critical things to examine, of inventing our units of measurement, and of devising means for controlling our instrument of measurement (i.e., the observer)."

Among interesting departures are the elaboration of the Marston graphic-symbol technique of recording activities in sequence, a study of pre-school groups, and illustrative techniques for the discovery of the amount of resistance in test situations. Certain mental tests, for example, are found to be so affected by personality factors in both examiner and child that the scores obtained are open to serious question.

A few errors occur in the eighth and tenth columns of Table I. In Chapter V, Part I, the criterion of exposure to laughter is faulty in that external children were considered part of the group only if they laughed or smiled. This would tend to raise the "laughter index" spuriously.

In her insistence upon the development of techniques for measuring child behavior in an uncontrolled environment—a worthwhile aim, though scarcely obtainable in any subject-examiner relationship—Doctor Thomas is by implication skeptical of techniques which do of-

fer a certain amount of control or restriction of free play activities. To the reviewer this appears to be an unnecessary limitation. It is quite desirable and feasible to control certain aspects of the environment, to reduce the number of stimuli, even in social situations, and still reach valid conclusions with respect to the social behavior of children. The present book, nevertheless, is fruitful in pointing out the varieties of approach to the objective study of behavior as usually takes place in a nursery school. The book will repay careful reading on the part of any student of child development. It may be considered an essential prerequisite if the student contemplates the recording of child behavior in a general social milieu.

GEORGE D. STODDARD
University of Iowa

BRANEGAN, GLADYS A. *Home Economics Teacher Training Under the Smith-Hughes Act, 1917 to 1927.* New York: Bureau of Publications, Teachers College, Columbia University, 1929. vii. + 159 pp.

After a movement has made especial progress for a decade it is well to take note of the development and appraise the situation for present as well as for future accomplishment. Miss Branegan has done this in a thorough way by reviewing the work in home economics teacher-training in seventy-one colleges which are approved for such training under the Smith-Hughes act. The data were obtained from official reports of the Federal Board for Vocational Education and so dealt with that the study makes an excellent source book for those who are constantly asking for information concerning the nature and meaning of home economics teacher training.

The status of teacher-training in home economics before 1917 and the factors contributing to the development of this work since then are discussed. The development of vocational education in the home economics schools and classes, in day, part-time, and evening programs has influenced the teacher-training work of the colleges. This relationship is well analyzed and described. The supply and demand of teachers, entrance requirements to teacher-training courses, qualifications of teacher trainers, courses in the curriculum studies on special programs, and fields for expanding the services of the institutions are discussed in the chapter on teacher-training institutions.

Thoroughout the study reference is made to the standards that have been reached. The problems of development for both the present and future are indicated and some suggestions have been made for their solution. Each of the six chapters of the book contains a summary which is brief and to the point; charts and tables help in a tangible way to bring important data to the reader. The bibliography is very worthwhile.

This book will be of decided interest and value to students who are preparing to be teachers of home economics, to members of teacher-training departments and to administrators of vocational education.

ENID W. LUNN
State of Ohio Department of Education

PINTER, RUDOLF. *Educational Psychology, an Introductory Text.* New York: Henry Holt and Company, 1929. xvi + 375 pp.

Professor Pintner has written just such a textbook in educational psychology as those familiar with his *Intelligence Testing* would have a right to expect. The

style is simple and lucid, the organization methodical. He follows Thorndike's dichotomy, Part I being devoted to original nature and Part II to its modification. He tempers the wind by reducing the number of tables (which pupils skip anyway) to nine, but furnishes three hundred fifteen illustrations, chiefly curves, charts, and pictures of test materials. The references, though excellent, are few so as not to discourage further reading. A summary and a series of true-false statements follow each chapter, the latter to serve as a basis for self-testing and discussion.

The chief innovation is the inclusion of a great deal of test material. In his preface the author affirms his belief "that a first course in educational psychology should contain the general field of educational measurement as an integral part of the course," not only because "many of our students do not have the time or inclination to take special courses in measurement," but also because of the contribution which this movement has made to the study of original nature and the learning process.

The book avoids controversial issues of a systematic nature, describes the more important experiments, tabulates the nature and results of others, and applies the results as far as may be to school practice. In short, it is just such a book as should probably be used for a course required of teachers-to-be who are no more than one or at the most two years out of high school. WM. CLARK TROW

University of Michigan

GOOD, CARTER V. *Teaching in College and University.* Baltimore: Warwick & York, 1929. xi + 557 pp.

The first impression which this volume gave is its inclusiveness. Obscure is the writer and trivial his contribution that has escaped this Argus-eyed compiler. The Index of Authors contains over 1,600 names, with several different references under many of the authors. It is difficult to think of an aspect or problem of higher education to which the volume does not somewhere include at least one reference. One can almost say that if an educational problem is not mentioned in this book it has not been treated in the educational literature of the past decade. When the reviewer received his copy he had just spent four months searching for reports of controlled and quantitatively-measured experiments on methods of college teaching. He found, in checking against Good's volume, that he had overlooked five qualified references which Good had recorded and had reviewed only three that Good had omitted.

Out of the first impression grew the second—the compiler's lack of discrimination. There is no way of ascertaining from the text the relative merits of the contributions mentioned. This inevitably results in a Who's More-or-Less-Who, or at least a What's More-or-Less-What, in Higher Education. A prolific writer remarked that Good had dug up an article which he, the writer, himself had forgotten about and which he wished he might forget again. This lack of bibliographical perspective will frequently vex the devotee of strictly objective evidence by necessitating his examining a lot of literature that will not meet his standard in order to find the little that will. But there are standards and standards, and what clutters up the book for one reader will be just that for which another is looking. Moreover, any attempt to evaluate and select either reflects a personal bias or presumes a degree of discriminative ability which the author of

this volume would be the last to claim. Neither does he often venture to interpret the evidence or synthesize the views which he reports. The volume is what its secondary title announces it to be, namely, an organized inventory of the problems and literature relating to higher education. The organization is reasonable and the evidence and opinions are woven into a running comment which makes them easily readable. The author justifies what he does not attempt on the ground that "the intellectual activity and growth of the student or professor will be stimulated more vigorously and individual interests met more adequately if he performs these services for himself." (p. 9.) It is gratifying to find a textbook that aims to leave something for the teacher to supplement and the student to do.

The final impression which the volume gave is its usefulness. By means of cross references or repetitions the evidence and views are presented in a half-dozen places and ways. Chapter I alone is a veritable thesaurus of information on source material—evidence of a growing interest in the problems of higher education; educational directories; associations, bureaus, foundations, and publications concerned with higher education; bibliographies, abstracts, and theses; research agencies; and publishers. The Appendix contains bibliographies on special method, the curriculum, and problems in twelve subject matter fields, as well as a miscellaneous list of references. The seven intervening chapters deal with the status of colleges, students, and teachers; objectives and standards in higher education; selection and organization of subject matter; the psychology of learning; conduct of the class period; measurement and guidance in higher education; and reorganization and adjustment in higher education, improvement of college teaching, and research. The volume is indexed separately by authors and by topics.

In whatever capacity he resides and from whatever angle he approaches, the student of higher education should find this compendium a useful guidebook. It may route him over detours, through heavy traffic, or down ten-miles-per-hour village Main Streets; but he will reach his destination.

EARL HUDELSON
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RESEARCH ABSTRACTS and BIBLIOGRAPHIES

Address all communications relative to research abstracts and bibliographies to Editor A. S. Barr, University of Wisconsin, Madison, Wisconsin.

BULLETINS

Die erziehungswissenschaftliche Forschung. Paedagogische Gesamt-bibliographie (Educational Research. Complete Pedagogical Bibliography), issued by authority of the Academy of Sciences of General Utility at Erfurt, in connection with the German Archiv of Juvenile Welfare, the German Council for Education and Instruction, the Library of the Prussian Ministry for Commerce and Trade, and the Central Institute for Education and Instruction. Edited by Professor Dr. Arthur Hoffman (Erfurt). Published by Kurt Stenger, Erfurt, Germany, VII and VIII, 1929.

Volume VII contains: the first part of the pedagogical bibliography of the first half-year of 1929; German books on education; doctor's dissertations from the German universities; a bibliography on remedial pedagogy; and a section on the literature of social service for the welfare of youth.

Volume VIII contains: the second part of the pedagogical bibliography for the first half-year of 1929; the German educational treatises and articles for the first half-year of 1929; a bibliography of the total periodical literature in the German language; the science of education in research and teaching in the universities the *Technischen Hochschulen* and Pedagogical Institutes of the German language territory; the courses, grouped according to subjects, given in the Pedagogical Academy of Prussia during the summer session of 1929; a bibliographical compilation of Alfred Kühne's professional publications; and the literature of the vocational and trade school education.

These bibliographies issued by the Academy of Erfurt are authoritative and complete.

DORING, W. O. "*Psychologie der Schulklasse* (Psychology of the school-class)," *Handbücher der neueren Erziehungswissenschaft,* A. W. Zickfeldt, Osterwieck a.H., IV, 1927, 219 pp.

A detailed report of an empirical investigation carried out by teachers of Lübeck under the direction of the author. The structure of the class-community as a whole was the object of investigation. A wealth of observation on the following subjects is reported: individuality of pupils, formation of groups, phenomena endangering the class-community, objective and subjective community spirit, community activities, types of pupils and types of classes, relationship between the individual pupil and the class as a whole. The findings convince the author that a class is a *Wesensgemeinschaft* (organic unit) in Professor Spranger's sense and a *Personoid* in the terminology of Professor William Stern.

FURFEY, PAUL HANLY. "A Selected Bibliography on Child Development,"

Educational Research Bulletin, Washington: The Catholic University of America, Catholic Education Press, IV, (April, 1929), 51 pp.

The author presents an annotated bibliography of 265 titles, largely from American sources.

MUCHOW, MARTHA. "*Psychologische Probleme der frühen Erziehung* (Psychological Problem of Early Education)," *Akademie gemeinnütziger Wissenschaften zu Erfurt*, Verlag Kurt Stenger, Erfurt, XIX, 1929, 86 pp.

This pamphlet contains four lectures given at the convention on kindergarten education at the Akademie in September 1928. Its purpose is to formulate more definitely practical problems of kindergarten education by means of certain viewpoints ascertained through scientific research. The discussions are closely related to concrete formations of the organization of child education, and they seek, by critical segregation and articulation, to clarify questionable points. The presumptions of modern research in the psychology of the child, and the problem of *Gemeinschaftsgestaltung* (community formation), are, especially, being investigated. The author concludes that neither "Learning from Montessori" nor "Back to Froebel" can be considered as a solution to problems of kindergarten education, but that modern psychological research must give the foundation for such educational work.

PRIDDLE, OAMER DANIEL. *Procedures in Developing Character Controls Through Instruction*, Doctor's Thesis, University of Pennsylvania, 1929, 147 pp.

A descriptive investigation the purpose of which is to set up procedures by which character controls may be developed through instruction. Two illustrative experiments and a bibliography are given.

ROCK, ROBERT T., Jr. "A Critical Study of Current Practices in Ability Grouping," *Educational Research Bulletin*, Washington: The Catholic University of America, Catholic Education Press, IV, (May-June, 1929), 132 pp.

The author presents a critical analysis of current practices in ability grouping, as set forth in the literature of the subject, under the following headings: arguments for and against grouping; procedures followed in grouping; basis of grouping, number of groups to be recognized, size of classes, provision for transfer, etc.; intelligence tests as a basis of classification; other bases of classification, including educational status; experimental evaluations of ability grouping; etc.

SISTER M. IRMINA. "An Evaluation of the Vocabulary Content of Twelve Series of Primary Readers," *Educational Research Bulletin*, Washington: The Catholic University of America, Catholic Education Press, IV, (September, 1929), 52 pp.

The author presents a review of the literature on the subject of vocabulary content and an analysis of twelve series of primary readers used in Catholic schools.

TUMARKIN, ANNA. "*Die Methoden der psychologischen Forschung* (The methods of psychological research)," published by B. G. Teubner, Leipzig and Berlin, IV, (1929), 132 pp.

The investigation shows that all methods of explaining, describing, and understanding psychology suffer because of the antinomy between the two funda-

mental tendencies of psychological thinking: the endeavor, on one hand, to coördinate the different phenomena of life into a uniform coherency of experience, and, on the other hand, to recognize in all singular phenomena that unity of life. This discrepancy, which is especially obvious in the present day problem of the individual, and which makes understandable the limits of all applied methods, leads beyond pure theory, and makes the author inquire for the last non-theoretical roots of all psychological thinking. These irrational roots, in spite of the scientific character of psychology, can hardly be denied.

EXPERIMENTAL STUDIES REPORTED IN CURRENT ISSUES OF OTHER MAGAZINES

EDUCATIONAL ADMINISTRATION AND SUPERVISION

FLORY, CHARLES D. "Personality Rating of Prospective Teachers," *Educational Administration and Supervision*, XVI, (February, 1930), 135-143.

The author presents a list of personality traits observed in the best and poorest high-school teachers by 370 college students, a rating scale of 25 traits based upon the above analysis, and a brief statement of the relationship between self-ratings and ratings by friends. The evidence of the study seems to indicate that one can determine his own strength or weakness in personality about as well as his friends.

EXPERIMENTAL STUDIES OF TEACHING

BENNETT, ERNESTINE. "An Experiment in the Teaching of Language in the Fifth Grade," *The Elementary School Journal*, XXX, (February, 1930), 440-443.

An experimental study of the value of repeated drill in the formation of language habits based upon a study of 17 fifth-grade pupils in the Lee Laboratory School of the University of Missouri. The author believes that brief drill periods are of greater value than discussion periods devoted to the development of the reasons for using certain expressions.

CONRAD, EDITH U., AND OFFERMAN, ELIZABETH J. "A Test of Speed and Quality in Manuscript Writing as Learned by Adults," *Teachers College Record*, XXXI, (February, 1930), 449-467.

The aim of this experiment was to find out by means of motion pictures how quickly a new motor skill, such as manuscript writing, can be acquired. Four subjects not familiar with manuscript writing were chosen for study. The findings indicate that manuscript writing is a type of writing which can be acquired easily and quickly, and that the learning of manuscript writing did not destroy the cursive form, but, on the contrary, tended to improve the legibility of the original form of writing.

EDUCATIONAL AND VOCATIONAL GUIDANCE

LAUER, ALVIN R., AND EVANS, J. E. "The Relative Predictive Value of Different High-School Subjects on College Grades," *School and Society*, XXXI, (February 1, 1930), 159-160.

Data is presented for a random sample of 492 students from the entering freshman class of 1926 at Iowa State College. The authors conclude that English aptitude seems to be the most closely associated with intelligence as measured by the conventional type of group test, and that high-school mathematics is slightly more valuable as a predictive measure of

success in college than any other single subject.

EDUCATIONAL TESTS AND MEASUREMENTS

PEATMAN, JOHN GRAY. "The Influence of Weighted True-False Test Scores on Grades," *The Journal of Educational Psychology*, XXI, (February, 1930), 143-147.

The author concludes that the use of the correction formula usually applied to true-false examinations is not necessary.

RULON, PHILLIP JUSTIN. "A Graph for Estimating Reliability in One Range, Knowing it in Another," *The Journal of Educational Psychology*, XXI, (February, 1930), 140-142.

A nomograph for estimating reliability in one range, knowing it in another.

SHEPHERD, J. W. "Report of the Oklahoma College Freshman Placement Test—Results," *University of Oklahoma Bulletin*, Norman, Oklahoma, 1930, 29 pp.

The bulletin contains a statistical and graphical analysis of the results of the Oklahoma College Freshman Placement Test, with a report of the median performance by high schools and a discussion of the predictive value of the test of 1928.

STAFFELBACH, ELMER H. "Weighting Responses in True-False Examinations," *The Journal of Educational Psychology*, XXI, (February, 1930), 136-139.

A true-false test consisting of 60 statements was submitted to 400 high eighth-grade pupils in social science. Two hundred forty-four cases were used. The author furnishes weightings for correct responses, incorrect responses, and no responses. He indicates that the usual right-wrong equation needs to be corrected because of the error introduced through omissions, and he supplies the proper formula.

WILSON, HOWARD E. "Further Comments on the Scoring of Continuity Tests," *School Review*, XXXVIII, (February, 1930), 115-123.

This article, with the previous article by Nesmith, constitutes a good discussion of the scoring of continuity tests.

INTELLIGENCE TESTING

BARRETT, HELEN ELIZABETH, AND KOCH, HELEN LOIS. "The Effect of Nursery-School Training upon the Mental-Test Performance of a Group of Orphanage Children," *Journal of Genetic Psychology*, XXXVII, (March, 1930), 102-122.

The authors review previous investigations in this field and present the results for 27 matched pairs of children between the ages of three and five, 27 of whom were in attendance at the Nursery School of the Chicago Orphan Asylum, and 27 of whom were not in attendance there. The authors conclude that orphanage children placed from six to nine months under a nursery-school régime showed consistently greater gains in mental-test performance than did a paired group of orphans deprived of this experience.

NEW TESTS

ADAMS, MAUDE, AND KNIGHT, F. B. "The French Work Book," published by Rand McNally and Company, New York, 1929.

ADAMS, MAUDE, AND KNIGHT, F. B. "French Vocabulary Drills," published

by Rand McNally and Company, New York, 1929.

RUGG, HAROLD, AND MENDENHALL, JAMES E. "Pupil's Workbook," published by Ginn and Company, Boston, 1930.

WELTE, H. D., AND KNIGHT, F. B. "Standard Service Geometry Work-Book," published by Scott, Foresman and Company, New York, 1929.

MISCELLANEOUS

ANGELL, JAMES ROWLAND. "The Yale Institute of Human Relations," *The Educational Record*, XI, (January, 1930), 3-11.

A good statement of the aims, purposes, and program of the Yale Institute of Human Relations.

"The Decroly Method," *L'Éducation*, XXI, (December, 1929), 129-160.

The December issue of *L'Éducation* contains three articles dealing with Decroly and his contribution to progressive education: "*Le Docteur Decroly, Sa Personnalité, ses Travaux, son Oeuvre* (Dr. Decroly, his Personality, his Travels, his Work)," by M. Montassut; "*Les Méthodes Froebel, Montessori et Decroly: Ce que nous apporte chacune d'elles* (The Froebel, Montessori and Decroly Methods: What We Learn from Each of Them)," by F. Brandt and H. Gemähling; and "*La Méthode Decroly*," a collaboration.

EELLS, WALTER CROSBY. "An Improvement in the Theoretical Basis of Five Point Grading Systems Based on the Normal Probability Curve," *The Journal of Educational Psychology*, XXI, (February, 1930), 128-135.

The author analyzes a number of methods of distributing grades and proposes the five point grading system with a standard distribution of 6-22-44-22-6 percents. If this distribution were adopted, the unit distances between true means of successive grade groups would be uniformly one sigma, with an error of less than one percent.

MONROE, WALTER S. "Difficulties in Educational Research," *Educational Research Bulletin*, IX, (January 8, 1930), 1-6.

Monroe points out difficulties in educational research: (1) difficulties encountered in locating the appropriate statistical formula for treating educational data, (2) difficulties encountered in the interpretation of the coefficient of correlation, and (3) difficulties growing out of the problem of sampling, or the generalization of results.

WATSON, GOODWIN. "Happiness among Adult Students of Education," *The Journal of Educational Psychology*, XXI, (February, 1930), 79-109.

This questionnaire study is based upon responses from 388 graduate students of education enrolled at Columbia University. The author presents a detailed analysis of the relationship between numerous traits, conditions and activities, and happiness, with a summary statement of his findings.

RESEARCH NEWS and COMMUNICATIONS

Address all research news and communications to Editor V. T. Thayer, Ethical Culture Schools, 33 Central Park West, New York City.

The report of Carl A. Jessen, Secretary of the *National Committee on Research in Secondary Education* indicates a number of concrete achievements in the past four and one-half years. As Secretary Jessen states:

During its four and one-half years of existence the Committee has carried through to completion a number of projects in secondary education among which the following are of special significance:

1. Formulation of a statement regarding research procedure. This statement prepared by a committee of which Arthur J. Jones was chairman, was printed by the U. S. Bureau of Education Bulletin, 1926, No. 24, *An Outline of Methods of Research with Suggestions for High-School Principals and Teachers.*
2. Preparation of bibliographies of completed and in-progress studies.
   a. Bibliographies of completed studies were printed as Bulletins of the U. S. Bureau of Education, 1926, No. 2, and 1927, No. 27. E. E. Windes was chairman of the committee organizing these materials.
   b. Under the chairmanship of John K. Norton, two bibliographies of in-progress studies were prepared and circulated in mimeographed form in February, 1926, and February, 1927.

   The demand for bibliographies of these two types indicated the advisability of extending this service to education on all levels instead of limiting it to the secondary school field. Following the announcement of the U. S. Bureau of Education that such service would be instituted the National Committee abandoned its projects for future bibliographies of studies in secondary education.
3. Investigation of rural junior high schools. E. N. Ferriss was chairman of the committee conducting this special study. The results of the investigation were published as Bulletin of the U. S. Bureau of Education, 1928, No. 28, *The Rural Junior High School.*
4. Sponsorship, including services of consultation and advice, in connection with the following studies:
   a. Montague, J. F. *Senior High-School Promotion Plans.* Manuscript, submitted to U. S. Office of Education for publication.
   b. Baer, Joseph A. *Men Teachers in the Public Schools of the United States.* Awaiting publication by Ohio State University.
   c. Proctor, Wm. M., and Brown, E. J. *College Entrance Requirements in Relation to Curriculum Revision in Secondary Schools.* Reported in sixth and seventh Yearbooks of the Department of Superintendence.
   d. Roemer, Joseph. *Secondary Schools of the Southern Association.* Pub-

lished as U. S. Bureau of Education Bulletin, 1928, No. 16.

e. Foster, Frank K. *Status of the Junior High School Principal.* Completed and manuscript considsidered by the U. S. Office of Education for publication.

5. Sponsorship of a series of articles appearing in *School Life*. The practice has been to have at least one article prepared by a member of the Committee appear in each issue of *School Life*. Thirty-five articles have been thus sponsored, eleven of these during the last year.

6. Assistance to the U. S. Office of Education in its service to secondary education. Specifically the Committee has been active in the following directions:

   a. Extending the subscription list of *School Life*.

   b. Furthering the plans for a National Survey of Secondary Education.

   c. Studying the services of the Office of Education to secondary education.

   The efforts of the Committee in these matters have been generally successful. The last-mentioned item has been a subject for consideration under the chairmanship of A. J. Jones during the present year.

7. Preparation of a list of topics suitable for investigation in the National Survey of Secondary Education. This list of problems was prepared by a committee of which E. J. Ashbaugh was chairman. Reactions to the outline were secured from more than 150 educators. The survey staff has found the outline and the reactions to it very valuable in planning the survey.

During the current year the policy of the Committee has been to leave its membership free for such service as may be requested of individual members in connection with the National Survey of Secondary Education. At the time this is written 17 members of the National Committee are being appointed to important committee positions in the work of the survey. It is becoming increasingly apparent that the National Survey of Secondary Education will, during the next two and one-half years, claim the time and services of the membership and will at the same time perform many of the functions of the National Committee on Research in Secondary Education.

The Department of Research of the Richmond Schools, Richmond, Va., has issued in bulletin form the results of a comparison study of the white and colored children in the seventh grades of that city. This bulletin reveals some significant facts. The colored children are found to be older chronologically, but much younger mentally and educationally than the white children, and fully a year below the norm for the given grade. The results indicate that the white children are accomplishing about as much in seven years as other children accomplish, while the colored children accomplish only 82 percent as much. There is no evidence that the children in Richmond accomplish as much in seven years as other children accomplish in eight.

The following is quoted from a report of the Department of Educational Research and Service of the San Francisco Schools and amply corroborated by statistical evidence:

For every 100 pupils in the public schools of San Francisco 15 are accel-

erated, 51 are at grade, and 54 are retarded.

...in every half-grade and in the totals there is less acceleration among the boys than girls, a smaller percent of boys at grade than girls, and a larger retardation among boys than girls.

...there is increased acceleration toward the twelfth year; the more favorable position of the girls; a greater percent of retardation in the low half-grades and the maximum retardation is between L —6 and L —9 grades, which amounts to nearly 40 percent of pupils within these grades, etc.

Three schools have no acceleration and one has 35.9 percent. The others are distributed between the two points, one-half above 9.94 percent and one-half below that point. One school (a special school) has no children at grade, and the percent of pupils at grade for the rest of the schools lies between 20.7 and 73.7. One-half of the schools have less than 57.75 percent of pupils at grade while one-half have more. In one school (a special school) all children are retarded. The rest of the schools distribute themselves between 71.2 percent and 10.4 percent of retarded pupils. One-half of the schools have more than 30.66 percent of pupils retarded and the others have less than that percent.

The median range of age variations for all half-grades is 10.2 years or, in other words, 50 percent of the half-grades have enrolled in them pupils varying more than 10.2 years in age. In 50 percent of the half-grades, the variability in age was from 10.2 years to 11.9 years, while in the other 50 percent the range was from 7 years to 10.2 years. Thus, there is in each half-grade a great difference in the age of pupils. In grade 4 there are pupils from 7 to 17 years of age and in grade 6 there are children from 8 to 18 years of age. The widest range exists in the grades 4 to 7. In grades where the majority of pupils are young children, there are many pupils of adolescent age, while in grades where the majority are of adolescent age, many young children are enrolled.

The Department of Education at Yale University is organizing a unique plan in its graduate school, beginning with the year 1930-1931. As stated by the announcement of the Department:

The following fundamentally important opportunities for graduate study will be offered, beginning with the year 1931-32. Several of these opportunities are rarely available even singly; in combination, they are offered for the first time.

1. A group of students, limited to fifty in number, selected with especial reference to intellectual maturity and capacity for independent thinking.

2. The complete segregation of this selected group. No undergraduate or extension students are admitted to the graduate group.

3. Practically the full time of seven members of the faculty—four professors, one associate, and two assistant professors—is at the service of the graduate group of fifty students. Additional members of the Department of Education and other departments of the Graduate School of the University are available for work in special fields.

4. Freedom from conventional courses and credit requirements.

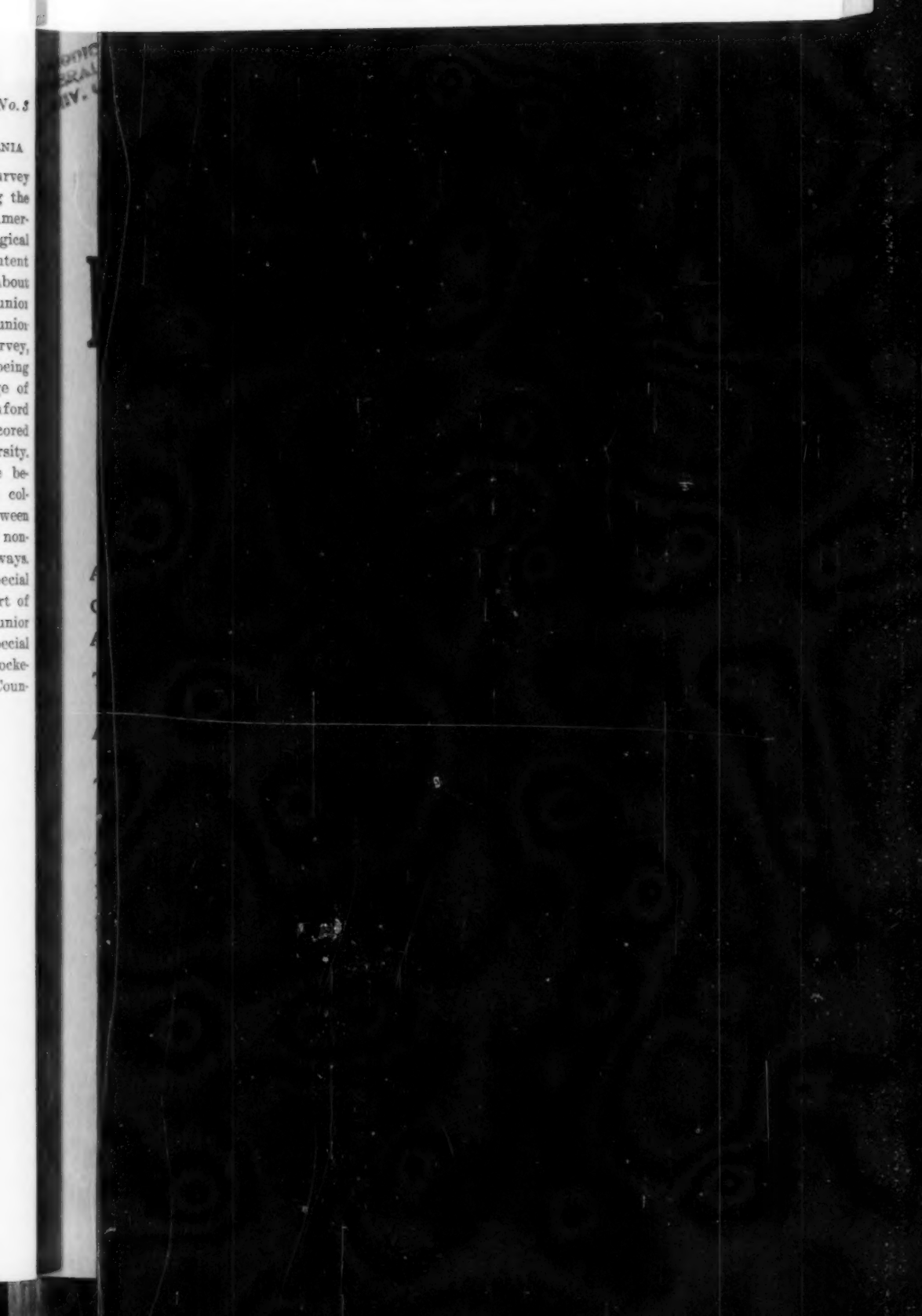
5. A general seminar, enrolling approximately twenty-five students and from six to eight faculty members, holds two two-hour sessions each week. This seminar, based on a comprehensive unified syllabus outlining the fundamental

data and problems of educational philosophy, history psychology, sociology, curricula, learning, instruction, supervision, organization, administration, financial support, and legal control, helps the student to achieve a unified understanding of the whole educational program, including the interrelation of its parts.

6. A special seminar, following the completion of the general seminar work, for each small group of students making vocational preparation for any one of a dozen special types of position.

7. Thesis seminars for students preparing dissertations or essays in candidacy for the Ph. D. or M. A. degree.

8. Extreme flexibility of program and conditions imposed for the purpose of affording each student the maximum of opportunity to apply his time and abilities most advantageously. In making individual adjustments, recognition will be given to the amount and character of advanced work that each student has already done. No student will be required to go through any routine of study that he has already mastered.

JUNIOR COLLEGE SURVEY IN CALIFORNIA

An extensive mental-educational survey has been carried on this fall among the junior colleges of California. The American Council on Education Psychological Test and the Iowa High-School Content Examination have been given to about twelve thousand students in the junior colleges of the State. Over forty junior colleges have participated in the survey, both public and private institutions being represented. The work is in charge of Professor Walter C. Eells, of Stanford University. All tests are being scored and summarized at Stanford University. Detailed comparisons will be made between the different types of junior colleges represented, as well as between classes, sexes, recommended and non-recommended students, and in other ways. The results will be published in a special monograph as soon as possible. Part of the expense is being met by the junior colleges involved, supplemented by special grants from the Laura Spelman Rockefeller Fund and from the American Council on Education.